NEC FUTURE
A Rail Investment Plan for the Northeast Corridor

Initial Alternatives Report

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Final

Submitted by:

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1 Introduction

1.1 PURPOSE OF THE NEC FUTURE PROGRAM

The Northeast region has one of the most extensive multimodal passenger and freight transportation systems in the world—highways, airports, ports, intercity and commuter rail, and public transit serving all major cities and many intermediate markets. However, despite significant investment over decades in all modes, the region still faces major congestion and capacity constraints. These constraints, if not addressed, have the potential to curtail future mobility and economic growth and place the Northeast at a competitive disadvantage to other regions of the U.S. and the world.

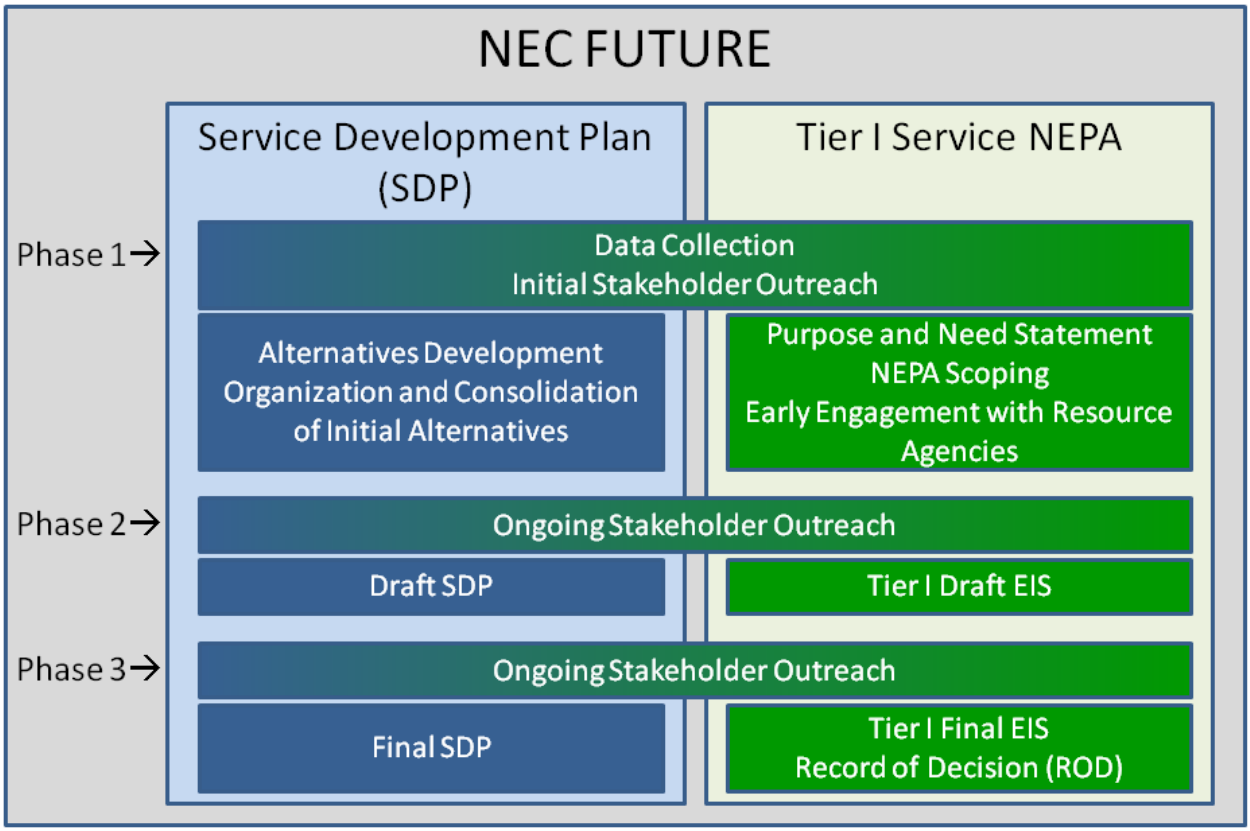
The goal of the NEC FUTURE Program is to prepare a Passenger Rail Corridor Investment Plan (PRCIP) for the Washington, D.C.–Boston Northeast Corridor. The PRCIP, consisting of a Service Development Plan (SDP) that articulates the overall scope and approach for proposed service and Tier 1 Environmental Impact Statement (EIS), will define an integrated, comprehensive passenger rail transportation solution for the Northeast. The purpose of this solution is to improve mobility, effectively serve travel demand due to population and jobs growth, support economic development, reduce growth in carbon emissions and dependence on foreign oil, and contribute to improved land utilization and investment in both urban and non-urban communities in the region.

1.2 OVERALL PLANNING AND ENVIRONMENTAL DOCUMENTATION PROCESS

The Federal Railroad Administration (FRA) is the designated Lead Agency for this project. The project has been divided into three phases, as shown in Figure 1-1:

- **Phase 1** involves the early service planning and alternatives development and evaluation. Technical work to be completed in Phase 1 includes: data collection, development of the project's Purpose and Need, preparation of a Public/Stakeholder Involvement Plan, analysis of existing and future ridership forecasts, operations analysis, service identification and evaluation, identification of infrastructure requirements and alternatives development, and the initiation of Early Engagement with Resource Agencies and National Environmental Policy Act (NEPA) Scoping process. The alternatives development process (which is the subject of this Initial Alternatives Report), will also include a high-level, coarse screening which will result in the advancement of a set of Preliminary Alternatives to be refined and evaluated in Phase 2.
- **Phase 2** will involve further refinement of the alternatives and the preparation of the Draft Tier 1 EIS.
- **Phase 3** will result in the preparation of the Final Tier 1 EIS and Record of Decision, as well as the draft and final SDP.

Figure 1-1: Project Structure



The complexity of a major capital investment initiative such as the one contemplated for the Northeast region necessitates extensive pre-construction preparation, including service planning, environmental review, design and conceptual engineering efforts. The NEC FUTURE represents the up-front planning effort that is necessary to determine the most appropriate level and type of investment. The NEC FUTURE program provides sufficient information to support an FRA decision to fund and implement major investment in a passenger rail corridor.

The scope of the NEC FUTURE program for the Northeast region includes the economic, financial, and environmental analyses necessary for implementing high-speed intercity, and commuter passenger rail as a core component of a better integrated, more efficient, safer, and higher-capacity Northeast regional multimodal transportation network that provides redundant and secure travel options.

1.3 PURPOSE OF THIS DOCUMENT

This Initial Alternatives Report documents the background and process for developing the set of Initial Alternatives that will be evaluated and advanced through the alternatives process. As the program advances, the number of alternatives will be reduced as the result of screening and

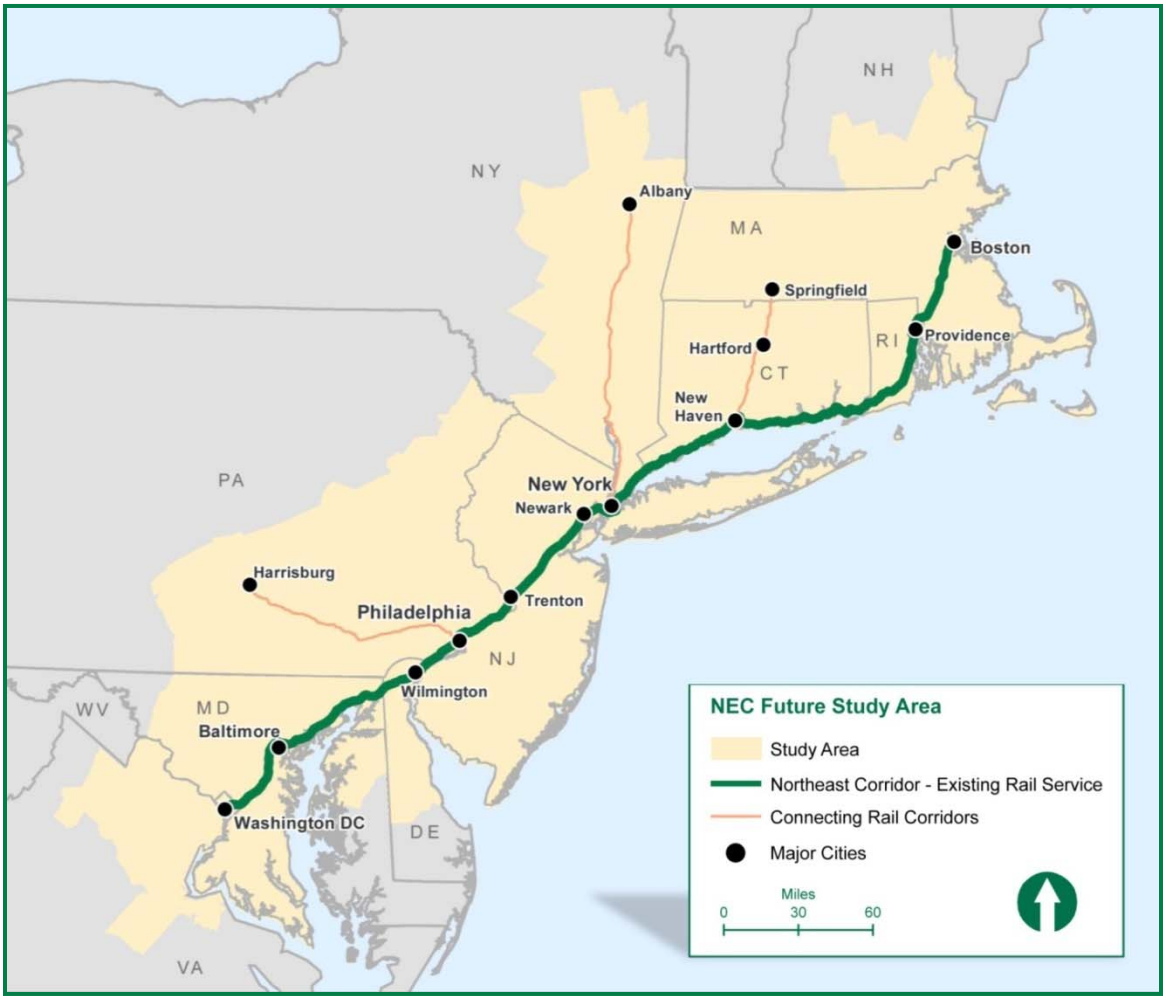
technical analyses, resulting in a set of Preliminary Alternatives and then Reasonable Alternatives, culminating with a recommended Preferred Investment Program.

1.4 STUDY AND MARKETS AREA

For purposes of the Phase 1 early service planning effort, the Northeast Region is defined to encompass Greater Washington, D.C., Greater Boston, MA, and points in between. The existing rail transportation spine of the Northeast region is a linear corridor linking Washington Union Station, Pennsylvania Station New York, and Boston South Station, known as the Northeast Corridor (NEC).

Figure 1-2 shows the existing passenger rail network that comprises the NEC spine, existing connecting services, and other major rail and highway links and airports. The Study Area encompasses the region served by the NEC spine, plus those areas that can be reached directly by train or via a single transfer to connecting corridors from the NEC spine, as well other areas considered part of the overall market area for these services. The Study Area definition will be refined as the alternatives development and EIS processes advances.

Figure 1-2: Study Area



2 Purpose & Need for Rail Improvements

The Purpose & Need for investment in the NEC passenger rail network is detailed in the NEC FUTURE Purpose & Need Statement, which is included as Appendix A. The NEC connects four of the nation's 10 largest metropolitan areas,[1] making the corridor an economic anchor for the nation with a population density triple the national average[2] and a $3 trillion economy.[3] Projections show that over the next 20 to 30 years there will be continued strong population,[4] economic,[5] and travel demand growth in the Northeast Corridor.[6]

The NEC and its connecting corridors (New Haven-Hartford-Springfield [NHHS], Empire, and Keystone) are among the most heavily utilized rail networks in the world and are shared by intercity, commuter and freight operations. The NEC moves more than 259 million (and growing) passengers every year[7] on Amtrak and eight commuter rail agencies, and approximately 370,000 tons of freight per year[8] on four freight carriers.

Maintaining the region's competitiveness for jobs and quality of life will depend in large part on the ability of its transportation system to accommodate growth, in terms of the ability to move both people and freight. Without improvements to and expansion of existing infrastructure, the predicted future growth of population and economy will result in travel gridlock[9] and lost economic growth potential. Rail freight movement on the NEC has already reached the levels forecast for 2030 in the NEC Infrastructure Master Plan, growing from 50 to 72 trains a day.[10]

Highways in the region are already congested,[11] and even with improvements, they will not be able to absorb future demand. The region's airports are facing similar capacity constraints and continual growing demand.[12]

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[1] U.S. Census Bureau, "Population Distribution and Change: 2000 to 2010, 2010 Census Briefs" (March 2011), Table 3, http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf.

[2] CONEG, "Regional Context."

[3] U.S. Dept. of Commerce, Bureau of Economic Analysis, Regional Economic Accounts (September 2012). [MSA estimates within study area are for 2010.]

[4] Moody's Analytics, Inc., 2012 data retrieved from Forecast and historical Databases, http://www.economy.com/home/products/databases.asp?src=left-nav.

[5] Moody's Analytics, Inc., 2012.

[6] The NEC Master Plan Working Group, The Northeast Corridor Infrastructure Master Plan (May 2010).

[7] The NEC Master Plan Working Group, Infrastructure Master Plan.

[8] NEC Commission Freight Committee, "Current and Future Freight Use of the NEC" (March 2012).

[9] National Capital Regional Transportation Planning Board, Metropolitan Washington Council of Governments, "Constrained Long-Range Plan, 2010 Congestion Management Process (CMP) Technical Report," (2010) accessed October 2012, http://www.mwcog.org/clrp/elements/cmp/files/CMP_Tech_Report_2010%20FINAL_09032010.pdf.

[10] NEC Commission Freight Committee, "Current and Future Freight."

[11] I-95 Corridor Coalition, A 2040 Vision for the I-95 Coalition Region: Supporting Economic Growth in a Carbon-Constrained Environment (December 2008), http://www.i95coalition.org/i95/Portals/0/Public_Files/pm/reports/2040%20Vision%20for%20I-95%20Region_Full%20Report.pdf.

Projected regional trip growth is expected to add millions of trips to the NEC's commuter rail carriers in the next 20 years, and intercity travel demand is expected to grow by as much as 45 percent.[13] Both commuter and intercity services on the NEC already face major challenges that limit current service and will further constrain their ability to meet future passenger rail demand, including capacity constraints and chokepoints, reliability problems due to aging infrastructure, and the operational and engineering challenges of introducing high-speed train service.

Addressing the capacity, frequency, travel-time needs, and reliability of transportation with market-competitive passenger rail service along the NEC will be critical to providing the mobility that will allow the future population, employment, freight, and economic growth of the Northeast to reach its potential.

[12] Transportation Research Board Airport Cooperative Research Program (ACRP) Report 31 Sponsored by the Federal Aviation Administration: innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions, Accessed October 2012, http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_031.pdf
[13] Moody's Analytics, Inc., 2010.

3 NEC Overview

3.1 INTRODUCTION

The 457-mile-long NEC rail infrastructure is owned by several entities:

- Amtrak (Washington, D.C., to New Rochelle, NY, and New Haven, CT, to the Rhode Island-Massachusetts border)
- New York Metropolitan Transportation Authority (MTA) (New Rochelle to the New York-Connecticut border)
- State of Connecticut (from the New York-Connecticut border to New Haven)
- Massachusetts Bay Transportation Authority (MBTA) (from the Rhode Island-Massachusetts border to Boston South Station)

This complex ownership and operational structure of the NEC is a result of the history of passenger and freight operations in the Northeast, which includes consolidations, bankruptcies, creation of a variety of public transit agencies and Amtrak, and record-breaking ridership and service expansion.

3.2 NEC RAIL SERVICE/ROLLING STOCK

The NEC supports commuter, intercity, and freight operations by over a dozen operators. These services use a wide variety of passenger and freight rolling stock.

- **Commuter:** Commuter rail, as defined by the Code of Federal Regulations (CFR), is "service within an urban, suburban, or metropolitan area." The commuter rail agencies operate 2,200 weekday trains along the NEC carrying 246 million passengers annually over the respective systems. Although the majority of these trips are traditional journey-to-work trips, many of these commuter railroads provide larger regional mobility options and have the potential to offer more in the future. Commuter rail agencies provide commuter and regional trips within metro areas, connecting travelers within the Washington, D.C., Baltimore, Wilmington, Philadelphia, Trenton, Newark, New York City, New Haven, Providence, and Boston areas. Operators include the following: Massachusetts Bay Transportation Authority (MBTA); Rhode Island Department of Transportation (RI DOT); Shoreline East (SLE); Metro-North Commuter Railroad (MNR); Long Island Rail Road (LIRR); New Jersey Transit (NJ TRANSIT); Southeast Pennsylvania Transportation Authority (SEPTA); Maryland Department of Transportation (MARC); and Virginia Railway Express (VRE).

  SLE and SEPTA operate along the spine of the NEC, and they offer service to NEC stations that are not served by Amtrak. VRE and LIRR offer exclusively branch services that are not on the NEC spine, but they interact with the NEC at major stations. The remaining five carriers (MBTA, RI DOT, MNR, NJ TRANSIT, and MARC) offer trains that operate both on the NEC spine and on branches off of the spine, connecting millions of people directly to downtown rail/transit and Amtrak facilities.

- **Intercity:** Intercity rail is an express passenger rail service that provides transportation between cities at speeds and distances greater than that of commuter rail. High-speed rail is a type of intercity rail that covers large distances at speeds significantly faster than traditional passenger rail traffic. Currently, Amtrak offers 154 daily intercity trains along the NEC providing service to 29 NEC stations, and serving the four largest metropolitan areas on the NEC: New York City, Philadelphia, Washington, D.C., and Boston. Amtrak service on the NEC spine and connecting trains from the Keystone, Springfield, and Newport News/Richmond corridors carried 12.6 million passengers in 2011.
- **Freight:** Freight operation constitutes the movement of goods and cargo in purpose-built freight rolling stock (e.g., boxcars, flatcars, etc.), which are hauled by diesel-powered locomotives. Some 72 daily freight trains currently operate on portions of the NEC, carrying local and long-haul commodities and products to shippers and ports. Major carriers include Norfolk Southern (NS), CSX, Providence & Worcester Railroad, Conrail Shared Assets, and the Connecticut Southern Railroad.

The FRA defines speed limits for passenger equipment based on tiers. Rolling stock meeting Tier I and Tier II standards are permitted to travel up to maximum speeds of 125 mph and 150 mph, respectively. Currently, the only operation in the United States that meets Tier II is the Amtrak Acela Express service. FRA will be introducing a new tier for all operations above 125 mph and up to 220 mph that runs on dedicated corridors, and meet the equivalent safety standards of Tier I on shared corridors. This new tier is expected to be designated Tier III. The NEC FUTURE team will work closely with FRA's Office of Safety as they continue to develop the passenger equipment safety standards in order to develop sound assumptions about future equipment and operations in the NEC study area.

3.3 GROWING DEMAND FOR NEC RAIL SERVICE

As detailed in the NEC FUTURE Purpose & Need Statement, travel demand on the NEC is expected to grow significantly in the future as the result of growing population and employment. Population along the NEC from 2010 to 2040 is expected to grow 6.7 million (or 13 percent), and employment is expected to grow by 5.5 million (or 23 percent). Nearly all of the commuter rail agencies have set new rail ridership records within the past five years, and the LIRR saw its best rail ridership since 1949.[14]

[14] Sources by Transit Agency:
VRE: Washington Examiner, Accessed September 5, 2012, http://washingtonexaminer.com/vre-ridership-soars-again/article/2503157#.UEezvrLN9kl
MARC: MTA, Accessed September 5, 2012, http://mta.maryland.gov/mta-sets-new-ridership-record
SEPTA: NBC Philadelphia, Accessed September 5, 2012, http://www.nbcphiladelphia.com/traffic/transit/SEPTAs-Ridership-Highest-in-22-Years-126346128.html
NJ TRANSIT: NJ TRANSIT Accessed September 5, 2012, http://www.njtransit.com/pdf/NJTRANSIT_2011_Annual_Report.pdf
LIRR: MTA, Accessed September 5, 2012, http://www.mta.info/lirr/News/2008/RecordRidershipAndOntimePerformance.htm
MNR: MTA, Accessed September 5, 2012, http://www.mta.info/mta/news/releases/?en=120123-MNR5

Amtrak set both national and NEC ridership records in 2011, and this trend has continued into 2012. The Keystone and Empire corridor trains accommodate more than a million riders each every year and the New Haven-Hartford-Springfield corridor has grown 18 percent since 2007.

Growing regional travel demand and rising fares, combined with peak-hour congestion, has led to growing off-peak demand on commuter rail, particularly around New York City.[15] By 2030, commuter rail demand is projected to grow by 58 percent and intercity rail demand by 76 percent. By that same time, the number of segments on the NEC that will not be able to serve demand because of capacity constraints is expected to more than triple without substantial improvements and operational changes.[16]

Freight demand just on I-95 along the NEC is expected to double over the next 30 years,[17] which will continue to increase both passenger and freight congestion on the Interstate.

3.4 EXISTING NEC INFRASTRUCTURE

The configuration of the NEC varies along its length and was originally constructed by a number of different railroads between the 1830s and 1920s.

- **Bridges and Tunnels:** In most locations the railroad was constructed either at the existing grade or on an embankment elevated above the surrounding grade. There are also numerous bridge structures at crossings of water bodies, wetlands, or other transportation infrastructure. These bridge structures vary in configuration, ranging from single short span bridges at local roads, to movable bridges over navigable waters, to multiple span viaduct structures with movable bridge segments such as the Susquehanna Bridge over the Susquehanna River in Maryland. Bridge structures vary in age and design, but the NEC contains hundreds of bridge structures that are approximately 100 years old or older, and numerous bridges that have reached the end of their useful life in terms of structural integrity. Likewise, the NEC contains numerous tunnels that were constructed in either the late 19th or early 20th century, and require either significant rehabilitation or replacement. This includes the historic Baltimore and Potomac Tunnel in Baltimore that was originally opened for service in 1873. Many of these bridges and tunnels cannot accommodate additional train volumes and create significant capacity constraints for NEC operations.
- **Catenary System:** The NEC is electrified and powered through an overhead contact wire between Washington, D.C., and Boston, MA. The catenary system between Washington and New Rochelle dates back to the 1930s. The fixed catenary system on much of the NEC places limits on train speed and is highly susceptible to variations in weather. Amtrak is developing a

SLE: Trainweb.org, Accessed September 5, 2012, http://www.trainweb.org/ct/2010AnnualReport.pdf
MBTA: MBTA, Accessed September 5, 2012,
http://www.mbta.com/uploadedfiles/documents/Bluebook%202010.pdf
[15] New York Metropolitan Transportation Council, Hub-Bound Travel, 2011.
[16] The NEC Master Plan Working Group, Infrastructure Master Plan.
[17] NEC Commission Freight Committee, "Current and Future Freight."

project in New Jersey to introduce constant tension catenary on a small portion of the NEC to improve reliability and accommodate higher speeds.

- **Track:** The track configuration typically consists of a two-track section north of New Haven, CT, and two-, three-, and four-track main line sections along the corridor south of New York. From New York to New Haven, the corridor is primarily a four-track railroad with some two-track and three-track sections. At several locations along the corridor, freight sidings without a catenary system also exist. At major stations and terminals, the number of tracks is typically greater; for example, there are 21 tracks in Pennsylvania Station New York.

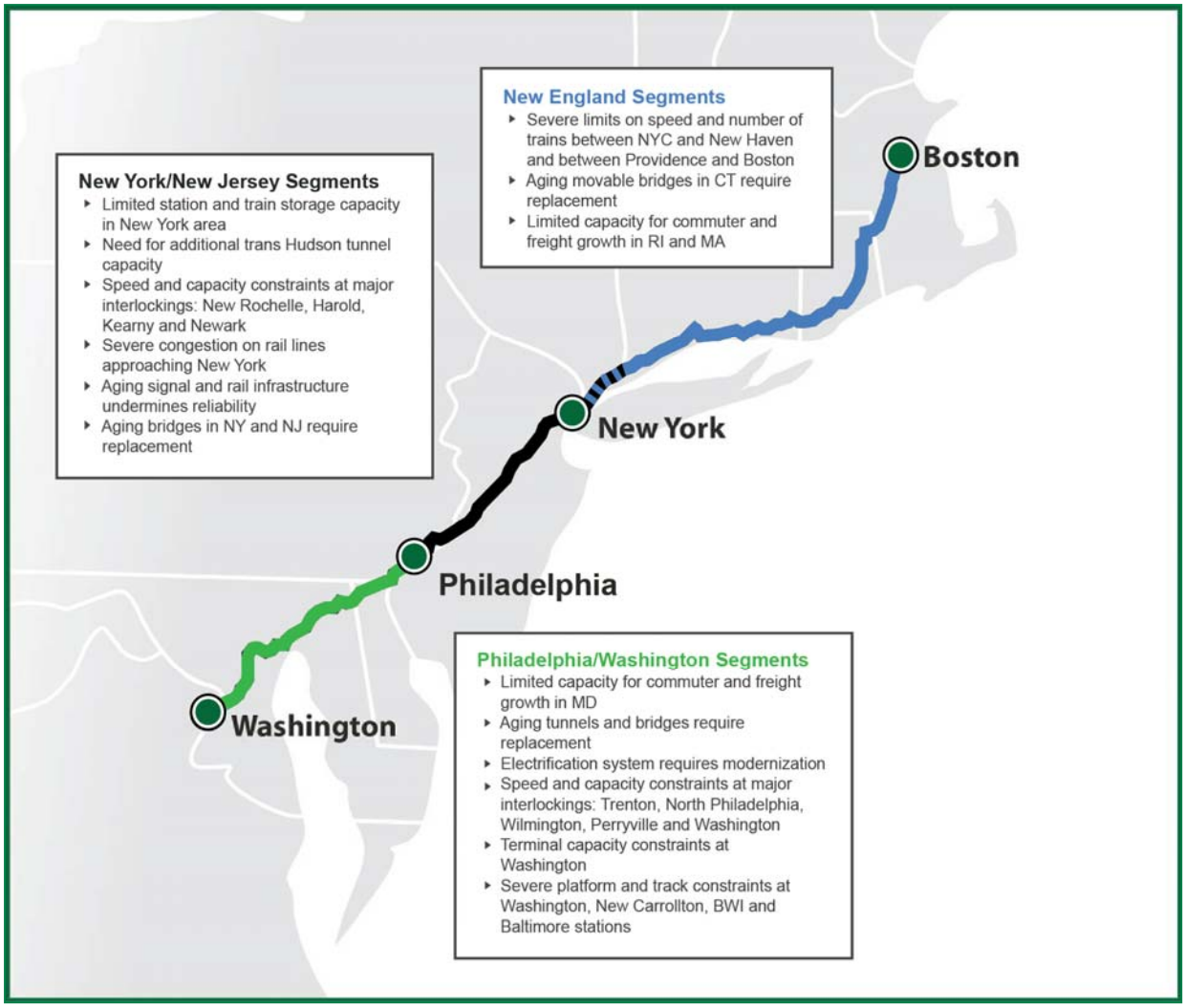
The aging condition of the NEC infrastructure imposes a significant challenge with respect to maintaining systems and equipment and providing the outages necessary to implement repairs on a heavily utilized railroad. Moreover, there also is a lack of redundancy in facilities and systems that severely undermines reliability in the event of failures or break-downs. Thus, a critical challenge moving forward will be to bring the railroad to a state of good repair, a backlog of essential improvements estimated in 2010 at nearly $9 billion.[18]

These infrastructure challenges affect the quality and reliability of existing intercity and commuter rail service on the NEC and will further constrain the ability to meet future passenger rail demand. These challenges include:

- Severe capacity constraints at critical chokepoints along the corridor limit service expansion and improvement, reduce operational flexibility and efficiency, and increase operating and maintenance costs (see Figure 3-1).
- Reliability and performance problems tied to limited track capacity and aging infrastructure create delays, increase trip times, and degrade service quality.

[18] The NEC Master Plan Working Group, Infrastructure Master Plan.

Figure 3-1: Capacity Constraints on the NEC



4 Level of Detail for the Initial Alternatives

With the goal of developing an overall vision for future rail service on the NEC and a coordinated plan for corridor investments, NEC FUTURE is focused on corridor-wide solutions that address the program's Purpose & Need. The goal is to create a broad blueprint for the NEC, defining capacity, service, relative trip-time, and reliability needs and the general physical and operations improvements required to meet those needs. Accordingly, alternatives developed as part of NEC FUTURE will include only the level of detail required to identify and understand technical and operational feasibility, transportation impacts and relative costs for needed improvements and to evaluate, through a Tier 1 programmatic or corridor-level environmental review, the environmental and operational impacts of those improvements.

The level of detail required for determining the specific alignment, selecting the location and configuration of stations, evaluating alternative construction methods, and preparing engineering design concepts and detailed cost estimates, is greater than what can be addressed in a Tier I EIS. Therefore, determining the exact location-specific solutions will be the subject of future analyses, which will entail a Tier 2 project-level environmental review.

Initial Alternatives represent broad ideas for providing or improving corridor-wide service objectives along the NEC. The Initial Alternatives have been developed to broadly focus on addressing the NEC FUTURE program's Purpose & Need related predominately to market and service concerns.

The description of Initial Alternatives will not include specific physical improvements or service plans. These details will be developed for the smaller set of **Preliminary Alternatives.** Characteristics will be further refined for the **Reasonable Alternatives** that will be eventually selected for full analysis in the Tier 1 EIS.

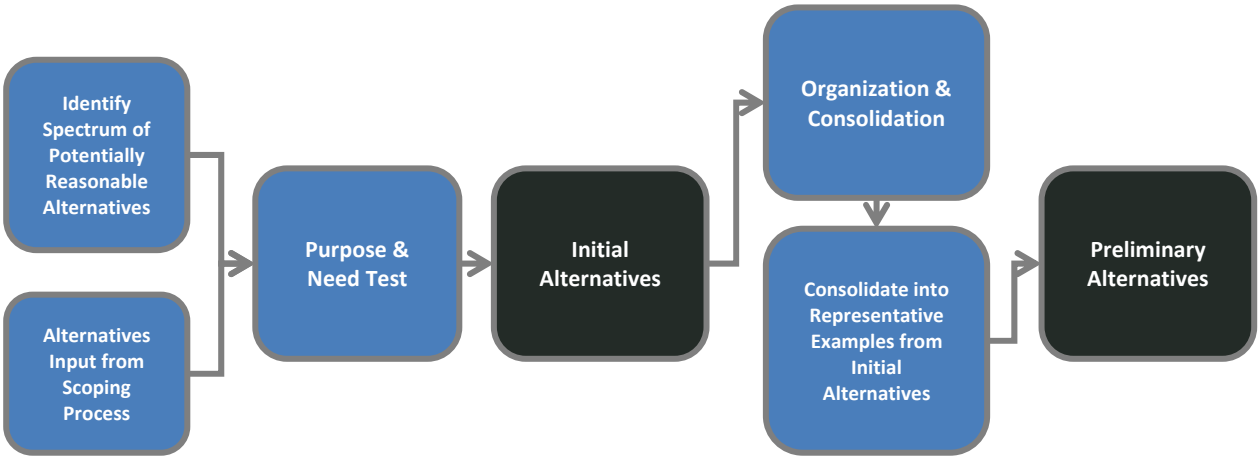
5 Development of Initial Alternatives

5.1 OVERALL PROCESS

The development of alternatives for the NEC FUTURE is a multi-step process that involves a large amount of information, interaction with stakeholders, and analysis. The process is shown in Figure 6-1, starting with identifying the broad spectrum of potentially reasonable alternatives to consider, including any alternatives identified by agencies, stakeholders, and other participants during the NEC FUTURE scoping process. All alternatives must meet an initial threshold test of reasonably addressing one or more of the goals detailed in the Purpose & Need. Those that do are included in the set of "Initial Alternatives." These initial alternatives are subsequently subjected to an organization and consolidation process, resulting in a smaller set of Preliminary Alternatives.

This process is summarized in Figure 6-1.

Figure 5-1: Process to Identify Initial Alternatives and Preliminary Alternatives



5.2 TRAVEL MARKETS

This alternatives analysis focuses on the travel markets and growth forecasts, which allows for the development of more accurate forecast of ridership and other transportation measures, and provides a more direct method of showing how alternatives address the Purpose & Need. Travel markets and associated demand is studied in two categories:

- **Interregional trips**—those that start and end in different metropolitan areas—are currently served primarily by Amtrak.
- **Intraregional trips**—those that start and end within the same metropolitan area—are primarily served by the commuter rail agencies.

Interregional and intraregional trips within the NEC often use the same limited infrastructure but have different travel characteristics and service needs, and currently have different service providers. Understanding the inherent differences between what is required to meet interregional and intraregional travel needs on the NEC is essential to understand the overall service and ultimately the infrastructure needs of the future system.

For the purposes of organizing the list of Initial Alternatives, the alternatives were compiled separately for the "North End" and "South End" of the NEC, with New York City as the North/South dividing line. New York City is selected as the dividing line because it is the dominant market in the Northeast study area—some 60 percent of all current NEC intercity rail trips begin or end in New York. While the NEC operates as a single corridor, the trips taken by a majority of NEC intercity riders began and end either wholly south of New York or north of New York.

5.3 SOURCES FOR NEC FUTURE ALTERNATIVES

5.3.1 Prior Plans, Studies and Reports

A broad data collection effort across the NEC Study Area was conducted. Data collected include capital and operating plans, environmental data and studies, growth and ridership projections, short and long range plans, and other visioning and planning documents such as:

- NEC and connecting corridor rail operators, including commuter authorities, Amtrak and the freight railroads;
- State resource agencies, including transportation, environmental, and economic development agencies and departments;
- Federal modal agencies, including air, highways, transit, rail and waterways within the US Department of Transportation;
- Planning organizations, including Metropolitan Planning Organizations across the corridor; and
- Non-governmental and private organizations that study and otherwise impact the NEC.

5.3.2 Agency and Public Scoping

The Scoping process for the NEC FUTURE program included 18 agency and public meetings across the corridor and one corridor-wide agency webinar. Scoping began June 22, 2012, with a Notice of Intent in the *Federal Register*. Those speaking at the meetings or submitting comments to the FRA and through the project website proposed a number of Ideas for possible future improvements to the NEC, including service to new markets and possible new alignments. The comment period was open through October 19, 2012. For additional information on the scoping process, please refer to the Scoping Summary Report.

Public Scoping meetings were held in the following locations:

- Boston, MA 8/13
- New Haven, CT..... 8/14

- Baltimore, MD 8/15
- Newark, NJ 8/15
- New York City, NY 8/16
- Wilmington, DE 8/20
- Philadelphia, PA 8/20
- Washington, D.C. 8/21
- Providence, RI 8/22

5.4 GUIDELINES FOR INITIAL ALTERNATIVES DEVELOPMENT

The fundamental guideline used to determine whether an alternative qualifies as an Initial Alternative was: *Would implementation reasonably address one or more goals identified in the Purpose & Need?*

If an alternative does not meet the NEC FUTURE preliminary Purpose & Need (e.g., relating to markets or geography falling outside the Study Area, or would be unlikely to address the markets, service, reliability or capacity needs of the NEC), it was not included in the list of Initial Alternatives. This minimal requirement ensures that a broad range of service and market alternatives is evaluated during the alternatives development process. For example, a route going from New York to Boston via Poughkeepsie and Worcester was not included in the list of Initial Alternatives because it would be circuitous yet serve fewer markets.

5.5 ORGANIZING THE LIST OF INITIAL ALTERNATIVES

The full range of potentially reasonable solutions in the NEC FUTURE Study Area includes various combinations of alternative routes and service types.

- **South of New York**, these include routing options to Washington via Philadelphia and Baltimore along the existing NEC spine, as well as via the Delmarva Peninsula. Other possible routes for intercity rail service did not meet the Purpose & Need for such reasons, for example, as having routes that were too circuitous or having routes that did not serve the three Primary markets of New York, Philadelphia, and Washington D.C.
- **North of New York**, potentially reasonable route options include several potential routes via Long Island and Central Connecticut. Each of these alternative routes could support varying levels of service, train types and market focus.
- **Connecting Corridors.** In addition to a main NEC spine, there is also a multitude of corridors such as New Haven-Hartford-Springfield or New York-Albany-Montreal that could connect to dozens of other cities within the Northeast region.

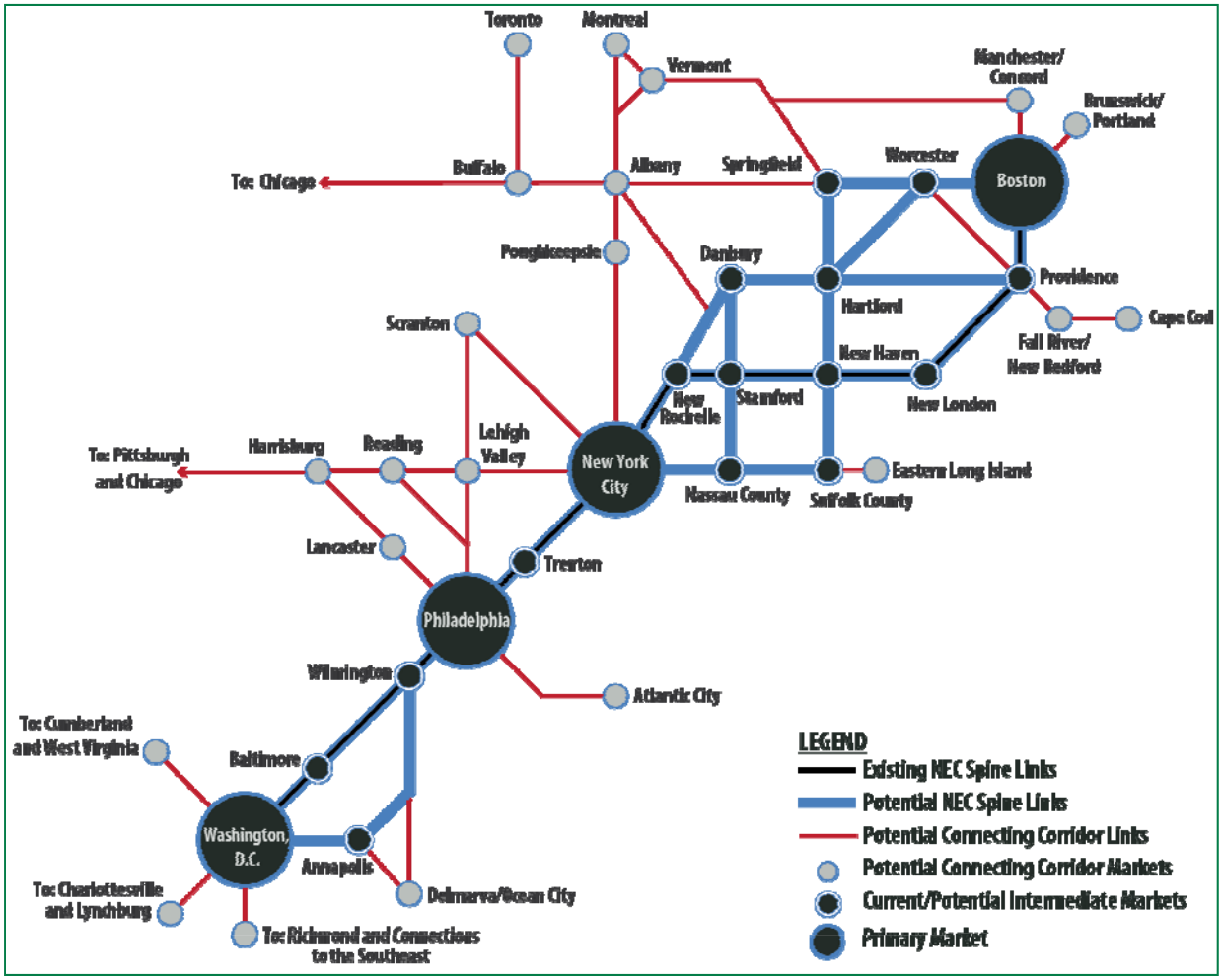
Figure 5-2 identifies the linkages between markets under consideration:

- The large circles in Figure 5-2 represent the primary markets. These four primary markets (i.e., Washington, Philadelphia, New York, and Boston) are the source of the majority of the current

intercity and commuter rail ridership and are projected to continue to be the dominant drivers of demand in the region through 2040, due to the large trip generation involved. The primary markets must be served by all alternatives.

- The medium circles represent secondary markets (e.g. Baltimore, Wilmington, Stamford, Hartford) that are under consideration for NEC spine alternatives.
- The thick blue lines represent the potential links between markets. Each permutation of nodes and thick blue links connecting the large circles may become an alternative that is considered in the process. (Although every link is in at least one alternative, not every possible path through the links in the network is considered an Initial Alternative.)
- The small circles represent markets on connecting corridors; thin red lines are the links between those corridor markets. Connecting corridors may serve many cities; only the largest markets are marked as nodes.

Figure 5-2: Initial Alternative Routes for NEC Spine and Connecting Corridors



5.5.1 Elements of Initial Alternatives

Each Initial Alternative is defined by four elements:

- The Route for rail service in the study area.
- The potential quantity of service that could be delivered depending on the level of investment.
- The service strategy that will be deployed between markets.
- The type of markets that will be the focus of the service (see Appendix B for more detailed definitions of the elements). This element is useful in organizing the Initial Alternatives will be absorbed into the service strategy during development of the Preliminary Alternatives.

All alternatives include the existing NEC spine route and may include an additional path. Elements of alternatives include:

- **Route (Markets Served)** – Describes a general path for travel between markets. Routes refer to broad corridors and are intended to identify the travel paths and markets served by the alternative. They do not include a specific right-of-way configuration or infrastructure footprint.
- **Program Investment Level** answers the question: How robust a vision for passenger rail is planned and, based on that vision, how much rail service can be provided to serve the markets? The amount of available funding drives the ability to add the capacity to support additional rail operations and service to new markets. The larger the investment in building the capacity of the rail line – its tracks, signal systems, bridges, station platforms and equipment—the more trains that can serve a market.

  NEC FUTURE applied four program levels –a low Baseline level, two medium levels (Baseline Plus and Medium) and High – to broadly test investment options in the NEC over the next 30 years. This results in a range of alternatives from the continuation of today's rail operations at the low end to the ability to provide significantly enhanced and robust service, including service to new markets and high-speed rail options at the high end. The four levels of investment used for the Initial Alternatives are as follows:

  - Baseline: Responds to projected 2040 demand in existing markets using existing infrastructure; achieves State-of-Good-Repair
  - Baseline-Plus: Meets projected 2040 demand in existing markets; includes investments to optimizes the potential of existing NEC spine
  - Medium: Expands capacity to accommodate targeted new service , new markets and additional growth
  - High: Major increase in quantity and type of service on the NEC spine and construction of a new HSR alignment[19]

[19] For simplicity, the nomenclature for the Program Investment Levels will be changed during the development of the Preliminary Alternatives and in the Alternatives Development Report to the following: A (Low); B (Medium-Low); C (Medium-High); and D (High).

- **Service Definition/Operational Environment.** Service definition/operational environment answers the question: what is the best way to provide service based on the markets to be served, level of investment in capacity and the primary emphasis of the service? For the Initial Alternatives, service definition is described in three general categories: current or today's conventional mix of service; and two types of enhanced service—simplified service mix and expanded one-seat ride. These categories encompass a broad range of potential service types for the Study Area. Current Mix forms the baseline for analyzing the impacts of the other service strategies. Enhanced Service include a number of different service patterns such as a simplified service mix or an expanded one-seat ride, and will be used to test the wide range of reasonable enhanced service types. These service strategies are intended to guide the development of potential service types for the alternatives. Their features are not intended to be absolute or exclusive to each service strategy. As the alternatives are refined in future phases of work, features from each of these service strategies may be combined to develop the best service plan for an alternative.

  Various "connection strategies" – such as coordinated transfers or run-through service from connecting corridors – will be applied to each service strategy to ensure that all potential market pairs in the study area are served.

  - **Current Mix**: Includes the current or conventional mix of train types (Acela/Premium High-Speed Rail, Regional/Limited Intercity, commuter, and freight) and institutional arrangements with the number of trains increased as needed to meet future demand. The service would still have a mix of train types, but the proportional mix would be "rebalanced" to respond to market demand.
  - **Enhanced Service Mix**: There are many different ways to operate the corridor. Two enhanced service options that are used in the Initial Alternatives are simplified service and expanded one-seat ride.
    - **Simplified Service**: Provides a limited group of services on a regular, repeating schedule to deliver higher frequency and throughput capacity than service plans with a greater variety of stopping patterns and train types. This may require more transfers and, hence, may not deliver the same trip times to major markets, but overall trip times remain competitive with other service approaches. This service approach provides an opportunity for greater frequencies to secondary markets through highly coordinated schedules and transfers.

      Services include:

      - Limited-stop express service
      - Multi-stop local service
      - Supplemental peak commuter service
      - Convenient transfers from connecting corridors to services on NEC Spine

    - **Expanded One-Seat Ride**: Focuses on maximizing the number of market pairs served with one-seat ride service, particularly for intermediate and connecting corridor markets, through the use of several services. These services include high-speed trains operating exclusively on high-speed or express tracks and other high-performance

services that share high-speed tracks and utilize available capacity on portions of high-speed territory with maximum speeds of 160 mph or less and without intermediate station stops (e.g., on final approach to NYC, Washington and/or Boston).

- **Service Focus** – describes the particular market type that is emphasized in the development of service improvements for those alternatives with an intermediate level of investment, where tradeoffs will need to be made about how various markets utilize the available railroad capacity. As noted, this element will be absorbed into Service Definition as the alternatives are further developed.

  - For the "Baseline," the focus would be on providing a basic level of service for intercity travel and serving projected 2040 regional demand to the extent possible within a relatively limited level of investment.
  - For the Initial Alternatives with Program Investment Levels in the medium range (Baseline Plus and Medium), one of the four customer markets could be the service focus: commuter, intercity primary markets (Washington D.C., Philadelphia, New York, Boston), intercity secondary markets (all other intercity markets) or connecting corridors. Markets that are not the focus for an alternative could receive limited direct benefits but will be served, at a minimum, at the baseline level of service.
  - For the Initial Alternatives with High Program investment Levels, all four customer markets would be enhanced as a result of the improvements to the NEC spine and addition of a new dedicated alignment for high-speed service.

6 Building the Initial Alternatives

6.1 NORTH-END OPTIONS (NEW YORK CITY - BOSTON)

To facilitate the process of developing routes and naming alternatives, the markets between New York and Boston were organized in two groups – New York to New Haven/Hartford and New Haven/Hartford to Boston. The name of each route is described as a set of links between New York and New Haven/Hartford and a set of links between New Haven/Hartford and Boston. For each route, alternatives are included that address different service and market requirements.

The routes within each of the two groups on the North-End include:

- **New York to New Haven/Hartford**
  - New Haven Line: Existing NEC spine between New York and New Haven
  - Central CT: Route between New York and Hartford via New Rochelle, Danbury, and Waterbury
  - Nassau-Suffolk: Route Between New York and New Haven via Nassau Hub and Ronkonkoma
  - Nassau-Stamford: Route between New York and Hartford via Nassau Hub, Stamford, Danbury, and Waterbury
- **New Haven/Hartford to Boston**
  - Shore Line: Existing NEC spine between New Haven and Boston
  - Central CT (or via Providence if south section is Central CT): Route between Hartford and Boston via Providence
  - Via Worcester: Route between Hartford and Boston via Worcester
  - Via Springfield: Route between Hartford and Boston via Springfield and Worcester

By combining routes from each of these two geographic groups, thirteen alternatives were defined north of New York:

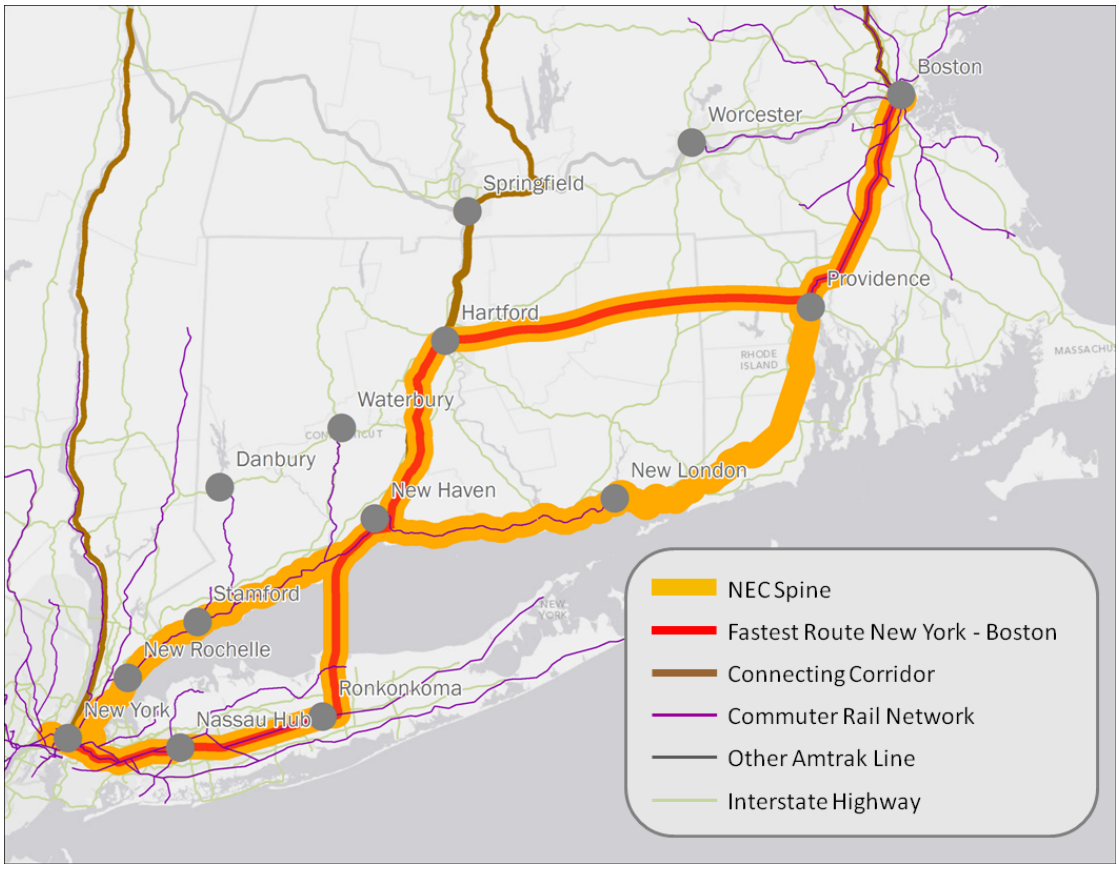
- New Haven Line - Shore Line
- New Haven Line - Central CT
- New Haven Line - via Springfield
- Central CT - via Providence
- Central CT - via Worcester
- Central CT - via Springfield
- Nassau-Suffolk - Shore Line
- Nassau-Suffolk - Central CT

- Nassau-Suffolk - via Worcester
- Nassau-Suffolk - via Springfield
- Nassau-Stamford - Central CT
- Nassau-Stamford - via Worcester
- Nassau-Stamford - via Springfield

While these network combinations cannot serve every market in the Study Area suggested by stakeholders or the public, they would serve all of the strongest markets identified and preserve the ability to serve new regional and intercity rail markets in the future, such as to Cape Cod, between Worcester and Providence, and to the Maryland shore.

Figure 7-1 presents an example of a North-End alternative route.

Figure 6-1: Example of North-End Alternative Route



6.2 SOUTH-END OPTIONS (WASHINGTON, D.C., TO NEW YORK CITY)

Due to the nature of the geography and distribution of markets south of New York, there are fewer alternative geographical routes than north of New York. As a result, alternatives south of New York are more focused on the routing through the major urban areas between Washington and New York.

The alternatives south of New York include:

- **Existing NEC:** A route following the existing Northeast Corridor from New York Penn Station to Washington Union Station via the existing paths through Philadelphia 30th St, Wilmington Station, and Baltimore Penn Station. Alternatives may incorporate slight deviations from the existing alignment to cut out sharp curves or other obstacles to higher speeds but preserves the existing stations.
- **City Center:** A route following the existing NEC for most links with new sections through the cities of Philadelphia, Wilmington and/or Baltimore. Alternatives will consider new paths through city centers, paths that may serve new markets within the city and/or paths that may dramatically increase speed and reduce travel time by developing a straighter alignment. Since the existing rail routes through all three cities currently have curves and alignments that necessitate relatively slow travel speeds, new paths through these cities have the potential to significantly reduce overall travel time.
- **Delmarva:** A route which may adhere to either the Existing NEC or City Center approaches between New York and Philadelphia, but which then alters course south of Wilmington. From Wilmington to Washington, the route turns south via the Delmarva Peninsula and approaches Washington from the east via Annapolis. This route would serve new markets and would connect the state capital of Maryland to major rail service. As in all alternatives planning, this route will only be considered in conjunction with continued upgrades to the existing corridor from Washington, D.C., to Wilmington via Baltimore and the preservation or improvement of existing service types to the Baltimore market.

6.3 COMBINATION OF ELEMENTS TO DEVELOP ALTERNATIVES

For each geographical route, different service scenarios are applied to develop the list of Initial Alternatives. Figure 7-2 illustrates the elements of the alternatives from New York City to Boston.

Each alternative consists of a unique combination of these elements. Figure 6-3 illustrates one unique combination that provides the “Baseline-Plus” quantity of service along the existing NEC with the current mix of services and a focus on the commuter markets.

Figure 6-2: North-End Initial Alternative Elements

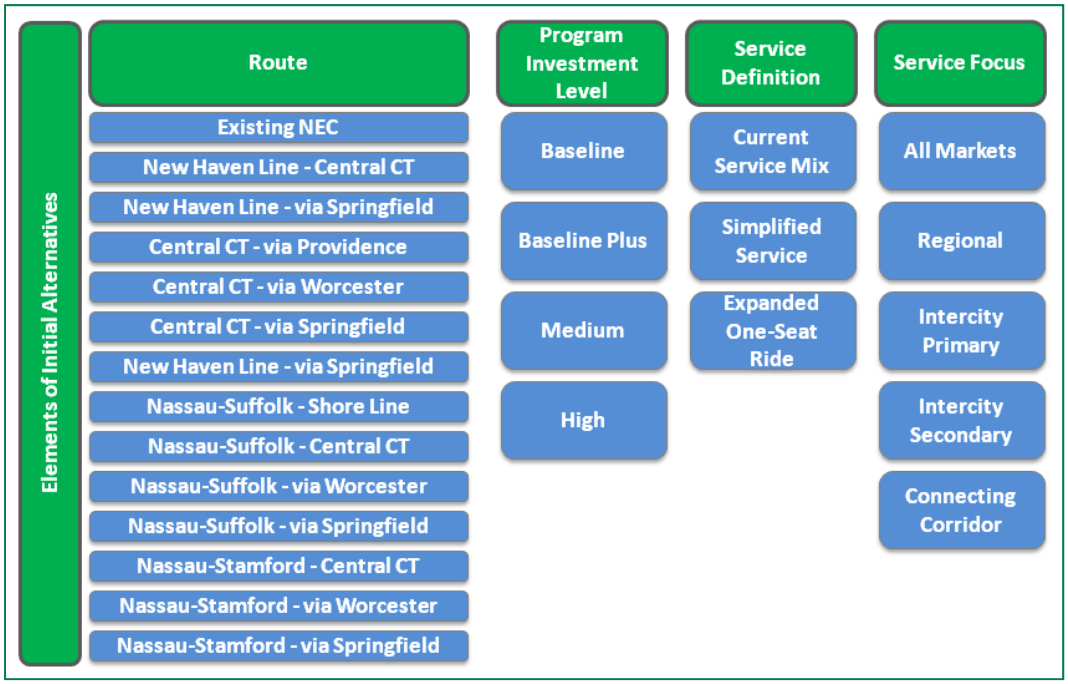
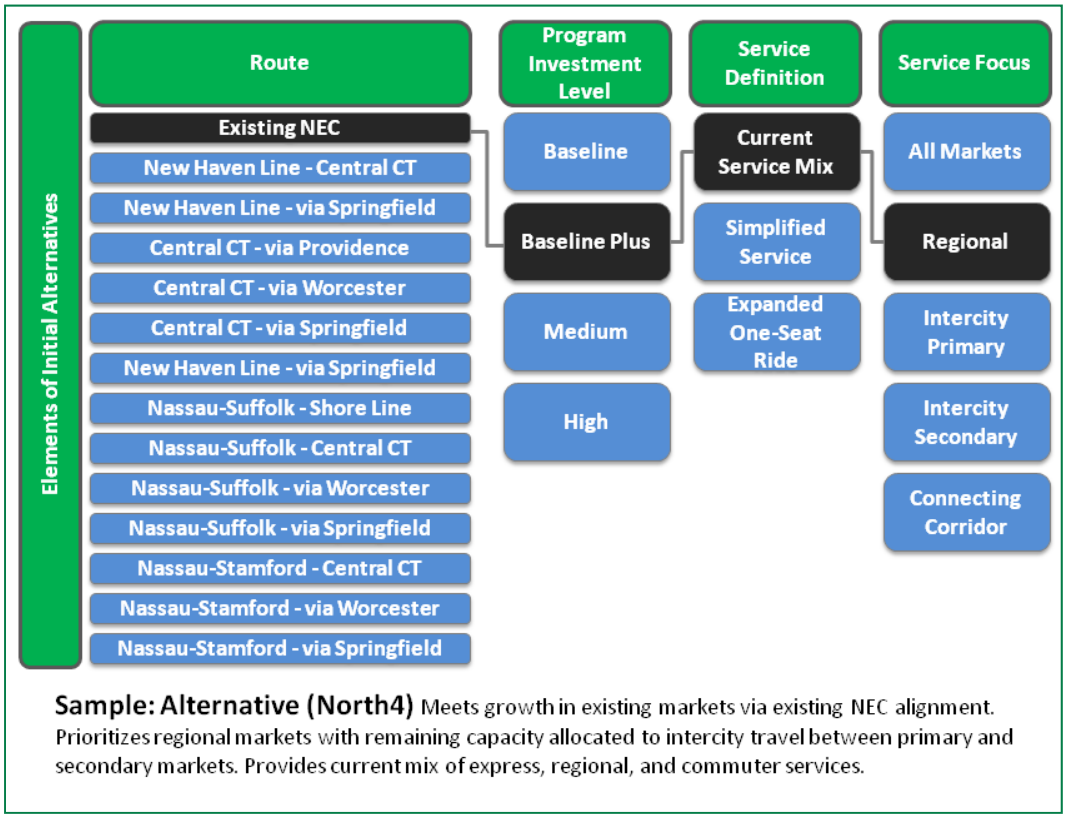


Figure 6-3: Example of a North-End Initial Alternative



Sample: Alternative (North4) Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.

Alternatives serving markets off of the existing NEC spine will require new infrastructure and new alignments. While costly, new alignments provide the ability to deliver substantive service improvements for all users of the rail line. Accordingly, the alternatives that do not follow the existing NEC route are assumed to provide a high quantity of service and to benefit all rail markets served. Forty-two (42) alternatives were defined where a portion of the alignment is off of the existing NEC spine.

In total, 98 separate Initial Alternatives[20] were identified, and they are listed and described in Appendix B. Each alternative represents a unique combination of geographical, market, service and investment needs. These Initial Alternatives incorporate route, service, and market needs identified through the data collection process, and through comments provided to the NEC FUTURE team during the Tier 1 Draft EIS Scoping process that are within the preliminary Study Area and that are consistent with the preliminary Purpose & Need.

[20] 28 North End Alternatives on the NEC spine + 28 South End Alternatives on the NEC spine + 42 off-NEC-spine Alternatives = 98 total alternatives.

7 Next Steps

The next steps in the process of developing NEC FUTURE alternatives are as follows:

- Develop criteria for organizing and consolidating the Initial Alternatives to generate a smaller set of Preliminary Alternatives
- Define Preliminary Alternatives

The goal is to develop a set of Preliminary Alternatives that appropriately encompasses the range of potential rail service solutions for various travel markets that might prove to be successful. These alternatives must be organized in a way that enables the comparative evaluation of alternatives, using both quantitative and qualitative measures, and the mixing and matching of alternative elements into an even smaller number of Reasonable Alternatives as the Phase 2 work effort progresses.

The criteria used to sort the Initial Alternatives and select the combinations of elements that are most appropriate will be mostly qualitative and will be used to eliminate features and elements that are either redundant or that do not serve travel markets as well or as easily as other elements.

The organizing and consolidating process will identify the representative combinations of service types, service quantity, and NEC network configurations that make the most sense to carry forward as Preliminary Alternatives.

Appendix A. Purpose & Need Statement

The following pages are from the final Scoping Package (USDOT FRA, June 2012, http://necfuture.com/pdfs/scoping_package_0612.pdf), excerpting pages 2 through 13.

2. PURPOSE AND NEED

2.1 INTRODUCTION

The Northeast region is facing serious mobility challenges, which, if left unaddressed, will have far reaching repercussions on the regional and national economy. The region is served by an extensive passenger and freight transportation system of highways, airports, ports, and rail. That transportation system has outdated technology and lacks sufficient capacity, connectivity and redundancy to support local and inter-regional mobility needs, resulting in major congestion and delays.

Moreover, regional population and economic growth will require investment in this transportation infrastructure to provide businesses with access to a growing workforce and resources and to provide residents with safe, reliable and convenient travel options. Highway, airport, and rail networks all face substantial challenges to meet their share of growing travel demand and each mode requires investment to address capacity and deteriorating conditions. The Northeast rail system has and will continue to play a critical role in shaping and supporting the development of the Northeast. Upgrades to that system are essential for connecting commuters and travelers with growing downtown business centers. A well defined and planned role for investment in passenger rail is required to improve the region's multimodal transportation network and its ability to support population and economic growth along the NEC.

The purpose of the NEC FUTURE program being led by the FRA is to:

- Define current and future markets for improved rail service and capacity on the NEC.
- Develop an integrated passenger rail transportation solution that:
  - Meets the existing and future service, reliability and capacity needs of the region.
  - Can be implemented incrementally.
  - Considers impacts to the environment and supports reductions in energy use.
  - Reflects the region's freight rail needs.
- Create a regional planning framework to engage stakeholders throughout the Northeast in development of this program.

The Purpose and Need Statement will play a pivotal role in every stage of the NEC FUTURE program. This section of the Scoping Package provides an abridged version of the Purpose and Need Statement. It defines the purpose of the program, the present and future challenges facing the Northeast region, and the need for passenger rail transportation solutions to address these challenges. It also establishes the program's goals and objectives that any actions under consideration must achieve to address identified needs. The statement presents a brief overview of the planning and regulatory environment in which the NEC FUTURE program will be advanced. These planning and regulatory elements are further described in other sections of this Scoping Package.

Numerous recent NEC studies will inform the NEC FUTURE program. These

NEC FUTURE *is a roadmap for future investments in an integrated passenger rail transportation system necessary to sustain and advance economic growth.*

include (1) FRA's NEC Programmatic Environmental Impact Statement (PEIS) in 1978, evaluating options for investment in the NEC; (2) the *Northeast Corridor Infrastructure Master Plan* (May 2010), a collaborative effort between key NEC stakeholders to define critical NEC investment needs; (3) extensive studies done for the Coalition of Northeastern Governors (CONEG); and (4) Amtrak's *Vision for High-Speed Rail in the NEC* and similar studies of NEC high-speed rail options by the University of Pennsylvania and the Regional Plan Association. These and other regional studies and individual railroad capital programs will be particularly useful in developing reasonable estimates for transportation system capacity, growth and travel demand forecasts.

2.1.1 Study Area

The Northeast region – an area comprising just 2 percent of the nation's land that generates over 20 percent of the nation's Gross Domestic Product (GDP) output[1] – encompasses eight states and the District of Columbia (see **Figure 1**) and is served by an extensive intermodal passenger and freight transportation system of highways, airports, ports, and rail systems linking the major metropolitan areas of Washington D.C., Baltimore, Philadelphia, New York and Boston.

The NEC, the existing rail transportation spine of the Northeast region – anchored by Washington Union Station in the south, Pennsylvania Station New York in the center, and Boston South Station in the north – is a vital component of this regional transportation system, with 80 percent of the region's residents living within 25 miles of an existing or proposed intercity passenger rail service.[2] Like the broader transportation system, the NEC currently faces serious capacity and operational constraints that limit opportunities to expand and improve services to support existing travel demand and projected population and economic growth. Many components of the system are in a state of disrepair or, worse, have reached the point of obsolescence.

For the purposes of defining and analyzing transportation alternatives for NEC FUTURE, the defined program Study Area (see **Figure 1**) encompasses the region served by the NEC, plus those areas that can be reached from the NEC directly by train or via a single transfer to connecting corridors (e.g., the Empire Corridor in New York). The Study Area will be refined as NEC FUTURE progresses and alternatives are identified.

Figure 1: Study Area

[1] "Regional Economic Accounts," United States Department of Commerce Bureau of Economic Analysis, accessed May 2012, http://www.bea.gov/regional/index.htm.
[2] Council of Northeastern Governors (CONEG) Policy Research Center, Inc., "A Regional Context for Intercity Passenger Rail Improvements in the Northeast" (prepared by Matthew Coogan, Resource Systems Group, Inc. and SmartMobility, Inc., August 24, 2009), http://www.coneg.org/reports/regional_context.pdf.

2.2 NEC FUTURE NEEDS

2.2.1 Introduction

The Northeast region is served by a comprehensive, multimodal transportation network. This rich transportation system supports a population density triple the national average[3] and is the backbone of a $2 trillion economy.[4] However, the limitations of the region's transportation network within all modes will constrain the growth, competitiveness and economic development of the region. These limitations will likely have impacts beyond the Northeast region and could impact how and where future population and business growth takes place in regional, national, and global contexts. The following sections will further describe projected growth in the Northeast, the associated projected increase in travel demand, the challenges the existing transportation network will face and the role that rail will play in meeting those future demands.

Findings presented in this Scoping Package rely on existing reports and datasets, which assume different baseline years, horizon years, and study areas, and present a piecemeal view of the region. The lack of an available, cohesive data set for the NEC FUTURE Study Area demonstrates the need to create a unified representation of the Northeast region as it is currently exists through the horizon year of this program, 2040.[5] This study relies on published 2040 projections for population and employment. For other projections or forecasts related to travel demand, 2040 figures are used where available and 2050 projections, in some instances, are used to interpolate 2040 estimates. Lastly, projections for other years, including 2025 and 2030, are included in this statement to support stated 2040 projections or to provide information where there is none currently available for 2040 or beyond. The available forecasts present a reasonable representation of the Northeast region, suitable for initial development of the program purpose, needs, goals, and objectives. As the NEC FUTURE program advances, a set of forecasts to 2040 will be developed to more consistently evaluate future conditions and to inform subsequent analyses.

2.2.2 Projected Population and Employment Growth

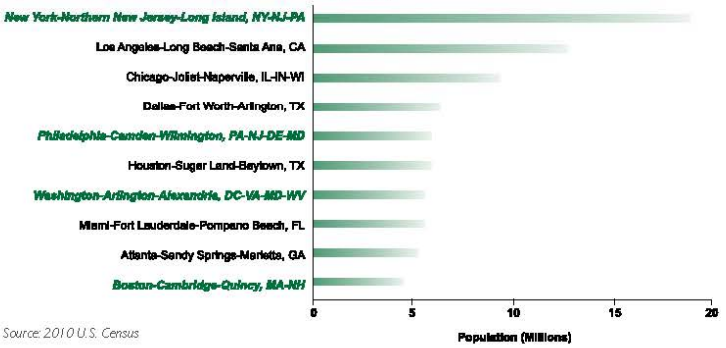
The NEC connects four of the nation's ten largest metropolitan areas (see **Figure 2**), making the corridor an economic anchor for the nation.[6] Projections by MoodysEconomy.com predict that both population and employment growth within the Northeast region will remain strong over the coming decades.

Population and employment in the program Study Area are projected to grow by approximately 6.7 million and 5.5 million, respectively, from 2010 to 2040, representing a 13 percent growth in population and a 23 percent growth in employment.[7] GDP in the Northeast is projected to grow by approximately 75 percent by 2040 (in constant $2010; see **Figure 3**). The four largest metropolitan areas – Boston, New York, Philadelphia and Washington, D.C. – are projected to continue to account for approximately 70 percent of the region's employment and population.[8] Roughly three-fourths of the region's employment growth is projected to occur in these four metropolitan areas.[9]

2.2.3 Projected Growth in Travel Demand

Although population and employment projections developed by public agencies and the private sector differ in certain ways, they are consistent in their forecasts that demographic and economic growth within the Northeast will remain strong over the next 30 to 40 years. This growth will result in travel demand and goods movement increases, which will place increasing pressures on the existing transportation infrastructure in the Northeast region.

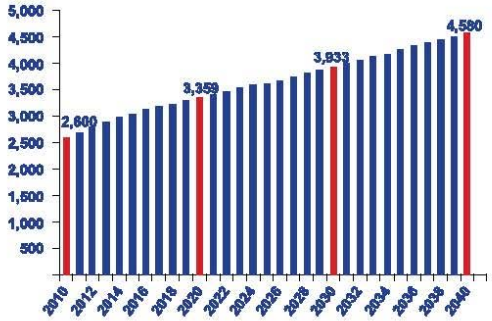
Figure 2: Largest U.S. Metropolitan Areas (2010)



Source: 2010 U.S. Census

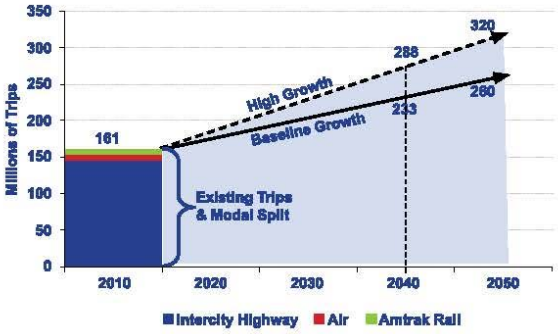
[3] CONEG, "Regional Context."
[4] The NEC Master Plan Working Group, *The Northeast Corridor Infrastructure Master Plan* (May 2010).
[5] 2010 is the baseline year and 2040 is the horizon year. Data used to estimate future population, economic, and travel conditions, however, rely on existing data sources each of which was created at different points in time for different purposes and with different forecast dates.
[6] U.S. Census Bureau, "Population Distribution and Change: 2000 to 2010, 2010 Census Briefs" (March 2011), Table 3, http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf.
[7] Moody's Analytics, Inc., 2012 data retrieved from Forecast and Historical Databases, http://www.economy.com/home/products/databases.asp?src=left-nav.
[8] Moody's Analytics, Inc., 2012.

Figure 3: Projected GDP in Northeast Corridor (Billions $2010)



Source: MoodysEconomy.com (2010)

Figure 4: Annual NEC Corridor Travel Volumes



Source: Amtrak, A Vision for High-Speed Rail in the Northeast Corridor, September 2010

Regional Travel

For regional commuter markets, Metropolitan Planning Organizations (MPO) project substantial trip growth, posing challenges for highway, rail and other transit modes. For example, strong growth in the Manhattan Central Business District (CBD) employment (25 percent from 2005 to 2030)[10] will increase demand for the largest commuter operators in the area – MTA-Long Island Rail Road (LIRR), MTA-Metro-North Railroad (MNR) and New Jersey Transit (NJTRANSIT) – all of which already face significant capacity limitations.[11] Commuter railroad riders today are not just peak-period commuters heading into a region's major CBD. In recent years, commuter railroads have seen significant growth in travel during off-peak periods on weekdays and weekends and in off-peak directions. For example, over the 1990 to 2010 period, off-peak trips into Manhattan on NJTRANSIT trains grew faster than peak-hour volumes, with the off-peak period's share increasing from 48 percent to 58 percent of total daily trips into the city.[12] These patterns demonstrate that difficulties in addressing commuter railroads' present capacity and reliability problems and the challenge of higher future demand will increasingly impact much more than the traditional commuter market. Left unaddressed, the impacts will be noticed in the traditional business sectors as well as the travel and leisure markets. Average weekday travel demand is projected to increase in the New York region by roughly 3.3 million trips from 2005 to 2030, with over 80 percent of those trips absorbed by highways and the balance by transit.[13] The Northeast's other high-growth metropolitan areas face equally pressing challenges; the Washington, D.C., metro area, for example, anticipates severe stop-and-go highway congestion conditions to be prevalent throughout the region by 2040.[14]

Intercity Passenger Travel

According to commercially developed population and economic projections,[15]

[9] Moody's Analytics, Inc., 2012.
[10] Regional Plan Association, *Tomorrow's Transit* (October 2008); Data source: New York Metropolitan Transportation Council Technical Memorandum by Urbanomics June 15, 2005.
[11] The NEC Master Plan Working Group, *The Northeast Corridor Infrastructure Master Plan* (May 2010).
[12] New York Metropolitan Transportation Council, Hub-Bound Travel, 2011.
[13] Regional Plan Association, *Tomorrow's Transit* (October 2008); Data source: Metropolitan Transportation Authority - Regional Transportation Forecast Model - O/D Trip Matrices - 2005/2030 for Autos and Transit Trips.
[14] "Constrained Long-Range Plan, Congestion," Metropolitan Washington Council of Governments, accessed May 2012, http://www.mwcog.org/clrp/performance/congestion.asp.
[15] Moody's Analytics, Inc., 2010 data retrieved from Forecast and Historical Databases, http://www.economy.com/home/products/databases.asp?src=left-nav.

total intercity trips will reach approximately 230 million by 2040, representing about a 45 percent increase from the 161 million trips in 2010[16] (see **Figure 4**). In fact, a study undertaken for the CONEG, a non-partisan association of governors, concluded that by 2025 (about halfway into NEC FUTURE's 2040 planning horizon) travelers in the Northeast region[17] would make over 200 million annual long distance trips to destinations within the region, each of which crossed a state line and was over 100 miles in length.[18]

Goods Movement

In addition to increases in regional and intercity passenger travel demand, overall population and economic growth in the region is expected to generate growth in goods movement. The existing freight demand of 40 tons per capita annually is forecast to increase as the population of the region continues to grow.[19] Estimates from the Federal Highway Administration's (FHWA) Freight Analysis Framework predict that by 2040, freight movement to and from the nine jurisdictions included in the Study Area will increase by 34 percent over 2010 totals, including 31 percent and 26 percent increases in truck and rail freight volumes, respectively. The growth in rail freight tonnage will require additional rail freight traffic along the NEC, increasing the potential for conflicts with projected increases in passenger rail service in the corridor. Growth in truck freight, which will continue to handle the majority of freight in the corridor, will increase congestion on already crowded highways in the Northeast region.

2.2.4 Ability of Transportation Network to Meet Future Demand

The NEC FUTURE Study Area is served by the nation's most comprehensive and complex transportation network, providing a broad range of passenger and freight transportation services. **Figures 5 and 6** identify the main highway, commuter and intercity rail networks and airports. The following sections discuss the region's existing highway, air and rail networks and services, the considerable challenges they face in meeting existing demand levels and the even larger challenges predicted when faced with the projected growth in travel demand.

Figure 5: Study Area – North

Highway Network and Service Issues

The Northeast is served by a dense network of Interstate and secondary state and federal highways, which collectively handle the bulk of the local, regional and intercity person and goods movement trips, including close to 90 percent of all intercity trips (i.e., those greater than 75 miles) within the Study Area. The Study Area's highway system, especially near

[16] Moody's Analytics, Inc., 2010.
[17] The CONEG study area included Maine to Washington, D.C., but did not include Virginia.
[18] CONEG, "Regional Context."
[19] NEC Commission Freight Committee, "Current and Future Freight Use of the NEC" (March 2012).

the major metropolitan areas served by the NEC, is already heavily congested.[20] The Interstate 95 corridor is the main continuous north-south highway within the market area of the NEC (see **Figures 5 and 6**) and serves the Cross Bronx Expressway, the most congested highway segment in the country.

FHWA studies on the nation's National Highway System[21] indicate that by 2035 many major highway routes in the NEC FUTURE Study Area, especially those near the heavily developed urban areas along the NEC, will be operating above capacity and under congested conditions. A 2040 vision study[22] by the I-95 Corridor Coalition, an alliance of transportation agencies, toll authorities, and related organizations from Maine to Florida, indicates a 70 percent increase in unconstrained demand[23] for roadway travel by 2040, assuming no substantial changes in competing modes. The urban Interstate roadways would be unable to handle the expected growth, resulting in an 84 percent increase in delay. The study's conclusions indicated that other modes would also have to add capacity to maintain their existing share[24] of regional demand. A more sustainable future would require tripling local/commuter transit

Figure 6: Study Area – South

[20] I-95 Corridor Coalition, *A 2040 Vision for the I-95 Coalition Region: Supporting Economic Growth in a Carbon-Constrained Environment* (December 2008), http://www.i95coalition.org/i95/Portals/0/Public_Files/pm/reports/2040%20Vision%20for%20I-95%20Region_Full%20Report.pdf.

[21] "National Statistics and Maps," Federal Highway Administration, accessed April 2012, http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats.

[22] I-95 Corridor Coalition, *2040 Vision*.

[23] Unconstrained demand is not limited by the capacity of the existing system

[24] I-95 Corridor Coalition, *2040 Vision*, ES 4.

ridership and increasing rail passenger ridership eight fold.[25]

Also, the existing highway system faces the challenge of upgrading an Interstate highway network substantially built during the 1950s and 1960s and older parkways and other highways built earlier in the 20th century. Rebuilding these heavily congested roadways under full operation will be challenging, creating substantial disruption and reduced effective capacity during those periods.

Over the past decade, intercity bus operations have responded to increases in travel demand in many markets throughout the country. Since 2006, intercity bus operations have experienced nationwide growth, much of which is attributable to low-cost curbside bus operations in the Northeast. Those operations grew by 23.9 percent[26] between 2009 and 2010 alone, driven largely by new Megabus hubs in Philadelphia and Washington, D.C.[27] Both the larger national bus operators and smaller carriers continue to provide expanded services that will further expand their role in the major Northeast travel markets (e.g., NYC-Boston, NYC-Philadelphia, etc.).[28] Nonetheless, intercity buses are dependent on the regional highway system, which, as noted, already is congested and faces an unsustainable increase in demand in the coming decades.

Table 1: FAA 2010 Annual Boardings and 2040 Forecasts for "Core Airports" in the Corridor (000s)

Airport	2010	2040	Growth
JFK	22,395	64,707	189%
Newark	16,498	34,281	108%
Philadelphia	14,827	30,972	109%
Boston	13,234	24,264	83%
LaGuardia	11,801	16,508	40%
Dulles	11,160	35,676	220%
BWI	10,611	23,321	120%
Reagan National	8,536	11,934	40%
Total Boardings	**109,062**	**241,663**	**122%**

Source FAA, Terminal Area Forecast Summary, Fiscal Years 2011 to 2040, 2012 (data from page 9)

Aviation Network and Service Issues

The region's airports, including some of the nation's largest, serve travel within and outside of the Northeast. **Table 1** shows boardings in 2010 and the FAA's projected growth in air travel at key airports[29] in the Northeast region during the NEC FUTURE planning horizon. As shown, these airports handled over 100 million passengers in 2010, and substantial growth is projected by 2040.[30] However, with capacity constraints on the current aviation infrastructure, the existing air network has been fraught with delay[31] and these airports are already among the nation's most congested.[32] The top four most delay-prone airports in the country are found in the Northeast,[33] with New York metro area airport delays alone accounting for roughly one-third of the air service delays nationwide. These delays spill over into the rest of the nation's air network – resulting in economic and social costs for passengers, airlines and others.[34] The costs attributed to estimated passenger delays and associated higher fares for the major airports of the NEC FUTURE Study Area are expected to increase from over $2.4 billion in 2010 to $7 billion by 2025.[35]

[25] The Coalition's 2040 Vision study used a vision of inter-city rail which had been developed for the National Surface Transportation Policy and Revenue Study Commission to guide its assumptions about passenger rail in the future.
[26] Excludes Chinatown bus operations.
[27] Chaddick Institute for Metropolitan Development, DePaul University, "The Intercity Bus: America's Fastest Growing Transportation Mode 2010 Update on Scheduled Bus Service" (2010), http://las.depaul.edu/chaddick/docs/Docs/Intercity_Bus_2010_Update_Final.pdf
[28] Chaddick Institute for Metropolitan Development, DePaul University, "The Intercity Bus Rolls to Record Expansion: 2011 Update on Scheduled Motor Coach Service in the United States" (2011), http://las.depaul.edu/chaddick/ResearchandPublications/index.asp.
[29] T. G. Green Airport in Rhode Island is not treated as a Core Airport and its forecasts were not included in this FAA source material. This airport has a presently underused station along the NEC rail line.
[30] Federal Aviation Administration (FAA), *Terminal Area Forecast Summary Fiscal Years 2011 to 2040* (2012), http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/taf_reports/media/TAF_summary_report_FY20112040.pdf.
[31] Airport Cooperative Research Program (ACRP), "ACRP Report 31: Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions," *Transportation Research Board of the National Academy of Sciences* (2010), accessed April 2012, http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_031.pdf.
[32] FAA, *Terminal Area Forecast.*
[33] "Chronically Delayed Flights," United States Department of Transportation Bureau of Transportation Statistics, accessed April 2012, http://www.bts.gov/programs/airline_information/chronically_delayed_flights/.
[34] ACRP, "ACRP Report #31."
[35] ACRP, "ACRP Report #31."

Recent studies[36] by the FAA addressing capacity limitations and airports in the Northeast highlight that many airports, even with planned Next Generation (NextGen) air traffic control and airport capacity growth, will be unable to handle the projected air travel demands. These studies further note the need to address both alternative modes for some of these intercity trips and improved transit connections to the airports. Given these limitations, policy analysts at the FAA have highlighted the need to better understand options to meet growing travel demand in high-density travel corridors, including increased high-speed ground transportation.

NEC Rail Network and Service Issues

The NEC and its connecting corridors (New Haven-Hartford-Springfield [NHHS], Empire, and Keystone), shown in **Figures 5 and 6**, are among the most heavily utilized rail networks in the world. Use of the NEC is shared by intercity, commuter and freight operations. The extensive passenger and freight rail system reflects a history of dense development around rail networks. Approximately 80 percent of the region's residents live within 25 miles of an existing or proposed intercity passenger rail service.[37] The NEC moves more than 259 million passengers[38] and approximately 370,000 tons of freight per year.[39]

Amtrak owns 80 percent of the 457-mile NEC, with the balance shared by Connecticut DOT, Massachusetts and MTA Metro-North.[40] There are also several connecting corridors, which have multiple owners including Amtrak, individual states, and freight railroads. This varied network is depicted on **Figures 5 and 6**.

Amtrak operates intercity rail service throughout the NEC and its connecting corridors. Amtrak's Acela Express is its premium service, reaching speeds of 150 mph between Boston and New Haven and 135 mph in segments south of New York City. Amtrak's Northeast Regional service, as well as state corridor services that traverse corridor segments en route to off-corridor destinations (the Vermonter, Ethan Allen, Adirondack, Maple Leaf, Keystone, Pennsylvanian, Amtrak Virginia and Carolinian), operate at speeds of up to 125 mph. These services run between Boston, New York City, Washington, D.C., and intermediate stations. Amtrak also operates Empire service between New York, Albany and Buffalo extending to Toronto, as well as limited Northeast Regional, Vermonter, and Shuttle service on the NHHS Rail Corridor. Near-term plans also call for Boston-Springfield-New Haven service on the Inland Route and the NHHS Rail Corridor. Longer-distance Amtrak trains heading to Chicago, New Orleans, Miami and other locations outside the region also operate over the NEC. Amtrak operates more than 150 daily intercity trains, carrying 13 million passengers annually on the NEC.

The following eight commuter rail systems operate about 2,200 weekday trains transporting 246 million annual passengers on portions of the NEC[41] (see **Figures 5 and 6**):

- Massachusetts Bay Transportation Authority (MBTA)
- Shore Line East (SLE)
- MTA-Metro-North Railroad (MNR)
- MTA-Long Island Rail Road (LIRR)
- New Jersey Transit (NJTRANSIT)
- Southeast Pennsylvania Transportation Authority (SEPTA)
- Maryland Area Regional Commuter (MARC)
- Virginia Railway Express (VRE)

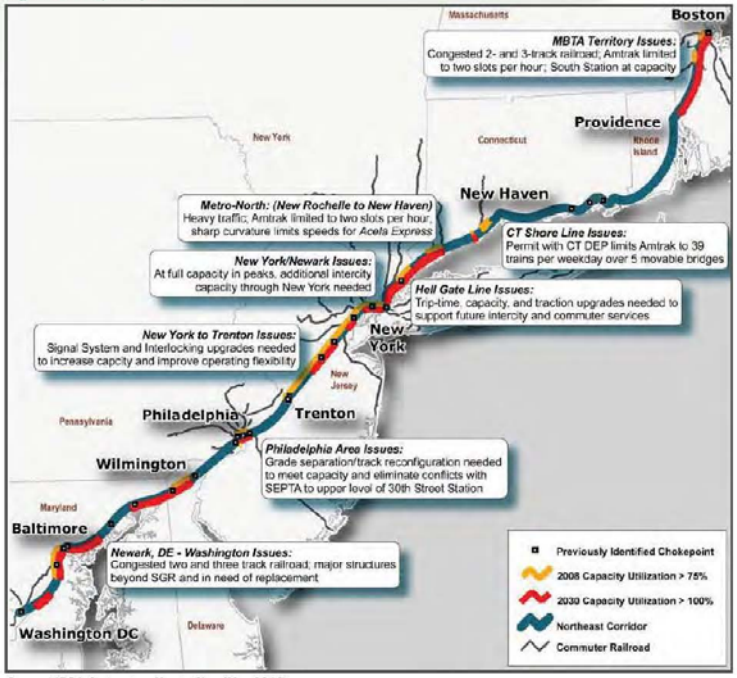
Rhode Island and Delaware support extensions of commuter rail services to their states via MBTA and SEPTA, respectively.

Both commuter and intercity services on the NEC already face major challenges that limit current service and will further constrain their ability to meet future passenger rail demand:

[36] Federal Aviation Administration, *Capacity Needs in the National Airspace System, 2007-2025, An Analysis of Airports and Metropolitan Area Demand and Operational Capacity in the Future* (prepared by the MITRE Corporation, May 2007); ACRP, "ACRP Report #31."
[37] CONEG, "Regional Context."
[38] The NEC Master Plan Working Group, *Infrastructure Master Plan.*
[39] NEC Commission Freight Committee, "Current and Future Freight Use of the NEC" (March 2012).
[40] The NEC Master Plan Working Group, *Infrastructure Master Plan.*
[41] The NEC Master Plan Working Group, *Infrastructure Master Plan.*

- Severe capacity constraints at critical chokepoints along the corridor limit service expansion or improvement, reduce operational efficiency, and increase operating and maintenance costs (see **Figure 7**).
- Reliability and performance problems tied to limited track capacity and aging infrastructure create delays, increase trip times, and degrade service quality.
- Speed and travel time performance measures are inconsistent with world-class high-speed passenger service found in other major rail corridors around the world.

Figure 7: Capacity Constraints on the NEC



Source: NEC Infrastructure Master Plan (May 2010)

NEC State-of-Good-Repair Challenge

Generally, the NEC rail network lacks the capacity and overall infrastructure to provide reliable and convenient service in those segments where competing intercity and commuter rail services strain the network's capabilities. These conditions make it difficult to accommodate existing riders or attract new riders, as the functionally obsolescent infrastructure cannot provide the required reliability and quality of service even for today's market. Without actions, these problems will worsen. For example, rail operating statistics collected on a weekday in November 1995 by NJ TRANSIT indicate that 14 NJ TRANSIT trains heading into PSNY between 7:25 a.m. and 8:50 a.m. were delayed an average of 21 seconds by unanticipated incidents. Data for the same period in 2005 showed 28 trains delayed an average of 6.8 minutes.[42] Conditions creating such delays have only worsened in the subsequent years. Incremental maintenance and repairs to address problems resulting from aging infrastructure will only result in further service disruptions and degradations in service quality during construction. As indicated in the *NEC Infrastructure Master Plan*, a comprehensive effort to address the NEC's substantial state-of-good-repair issues is needed. The corridor railroads need those long-delayed repairs and upgrades to reliably provide the service levels to meet today's demand requirements. These improvements, some of which will likely include some capacity and performance enhancements for affected sections of the NEC, will also provide a solid foundation for the types of more extensive capacity and travel time improvements being considered in NEC FUTURE to meet the future demands faced by the NEC states and passenger railroads.[43]

In the *2010 NEC Infrastructure Master Plan*, commuter rail demand is projected to grow 58 percent by 2030 (from 246 to 389 million annual passengers), requiring a 40 percent increase in commuter trains. Similarly, intercity rail demand over that period will rise by 76 percent (from 13 million riders in 2010 to 23 million by 2030). By that time, the number of over-capacity NEC infrastructure segments will more than triple without substantial improvements and operational changes (see **Figure 7**).[44]

Freight railroads operating on the NEC include Consolidated Rail Corporation (Conrail), Providence and Worcester, Norfolk Southern, and CSX Transportation (CSXT). Generally, freight trains carry a variety of commodities and general merchandise and operate during designated operating windows, often at night or with short-distance daytime runs.[45] Freight traffic includes a variety

[42] NJ TRANSIT Rail Operations, 2006.
[43] The NEC Master Plan Working Group, *Infrastructure Master Plan*.
[44] The NEC Master Plan Working Group, *Infrastructure Master Plan*.
[45] NEC Commission Freight Committee, "Current and Future Freight."

of movements along the corridor itself, with local freight serving customers on customers' sidings and branch lines with service provided by shortline railroads.[46] Freight demand along I-95 is projected to more than double over the next 30 years.[47] With over 40 percent of large-truck traffic[48] traveling on the already heavily congested interstate highway system, alternative modes of travel such as rail are an important option for meeting increasing future freight demand, which could put pressure on the already constrained passenger rail network. Rail freight movement on the NEC has already reached the levels forecast for 2030 in the NEC Infrastructure Master Plan, growing from 50 to 72 trains a day.[49]

2.2.5 Institutional and Operating Challenges Constrain the Ability of the Transportation Network to Address Needs

The ability to define a common solution to provide reliable, safe, time-competitive and efficient transportation across the Northeast region has and will continue to be limited by a variety of factors:

- Federal and state policies treat transportation modes differently, depending on funding sources, federal and state law, and infrastructure ownership. This includes separate funding mechanisms for highways, air, transit and Amtrak. Policies also differ based on mode and infrastructure owner.
- Several different owners and operators share responsibility for delivering passenger and freight rail service along the NEC. The different operating requirements for intercity, commuter and freight railroads, in combination with their specific service requirements, impact the mix, capacity and reliability of service overall. Commuters focus most on frequency and reliability; for intercity travelers, trip time is often critical and modal decisions are also often based on price. Over time, service providers have responded to these needs with a variety of transportation options that are often duplicative and consume available transportation infrastructure capacity inefficiently.
- Intensive development along and around transportation corridors and hubs limits the ability to expand facilities or otherwise address congestion and capacity constraints. This impacts rail lines, airports and highways alike, and prevents redistribution of trips to more efficient and travel-appropriate modes.

Equally as important, creating a planning platform to formulate a regional approach to transportation has been a challenge because the Northeast consists of multiple independent states and jurisdictions, each with its own interests and transportation policies. Planning efforts like those undertaken by the I-95 Corridor Coalition and the Coalition of Northeastern Governors have helped to define the Northeast region's transportation needs. However, there has yet to be a regionally-based approach to define and implement a balanced, efficient regional transportation network.

Regional planners and air and highway service interests have called for an increased role for rail modes, but the funding and institutional governance necessary to increase rail capacity have been lacking. The FRA's NEC FUTURE program is a critical initial step to creating the needed regional rail planning platform.

2.2.6 Regional Considerations

Energy and Environmental

The Northeast's overall high-density settlement pattern is a legacy of development that occurred before widespread use of the automobile. It is expected that between 2010 and 2040, population will grow by 13 percent, an increase of approximately 6.7 million people.[50] If this new population is accommodated in the similarly land-intensive manner of recent decades, important rural and open spaces will disappear, putting pressure on ecological and natural systems. Water quality would degrade both by the addition of impervious surface and because natural water recharge systems, such as the Delaware River Basin (which provides drinking water for 15 million people),[51] would be degraded by the pressure of increased land utilization. A passenger rail system would be part of a compact growth solution that concentrates new

[46] NEC Commission Freight Committee, "Current and Future Freight."
[47] NEC Commission Freight Committee, "Current and Future Freight."
[48] I-95 Corridor Coalition, 2040 Vision.
[49] NEC Commission Freight Committee, "Current and Future Freight."
[50] Moody's Analytics, Inc., 2012.
[51] Regional Plan Association, *Northeast Megaregion 2050: A Common Future* (November 2007).

growth and development around stations, thus conserving land and easing pressure on natural resources.

Furthermore, based on national data on passenger travel and energy use, intercity rail is a more energy-efficient mode compared to car or air travel.[52] Rail is 26 percent less energy intensive than travel by car, and 17 percent less energy intensive than air travel. Because carbon emissions are related to energy use, rail has comparably reduced carbon emissions on a per passenger-mile basis versus car travel and air travel.[53]

Economic

The Northeast region already endures costs from delays created by congestion of its transportation network. Various studies have confirmed this:

- Highway congestion and air travel delays together cost the Northeast almost $30 billion a year in lost productivity.[54]
- The Northeast contains three of the seven most congested metropolitan areas, with roughly an additional $1,100 a year in congestion costs[55] incurred per auto commuter. [56]
- The congestion and lack of redundancy of the NEC, highlighted by the recent problem in the NEC's Hudson River tunnels into New York City – a common problem throughout this highly congested and often antiquated corridor – resulted in extensive delays from Boston to Washington.[57]

Future burdens due to reduced mobility and higher congestion would only intensify these pressures and their associated costs will constrain the economic competitiveness of the region. These economic burdens would reduce the attractiveness of the Northeast region's key center city locations, leading to losses to other domestic and international corridors and providing an incentive for less efficient and sustainable growth in suburban and exurban areas.[58] This has particular economic importance given that the NEC's four major "hub" metropolitan areas generate roughly 88 percent of the corridor's GDP.[59] The core cities in these metropolitan areas collectively grew by roughly 8 percent over the 1990-2010 period, although Philadelphia and Washington, D.C. experienced 1 to 4 percent declines in population over this period. While the Northeast is the densest region in the U.S., much of the region's recent growth has occurred outside of core areas, and greater population and employment dispersion has increased travel patterns that overcrowd highways.[60]

Investment in the NEC and similar efficient investments in the other intercity passenger and freight networks to help meet the mobility requirements of a growing corridor is both a transportation and an economic need. The Northeast population and employment projections available from MoodysEconomy.com (and used for this study) assume that infrastructure and services would be improved sufficiently to maintain stable productivity and meet future mobility needs sufficiently to support that productivity. Actions that would worsen passenger and freight mobility would reduce productivity and lower projected growth. [61] These factors collectively confirm that major investments in the NEC and other modes are needed for the Northeast to grow and remain economically competitive in national and international markets.

Environmental, energy, and economic impacts from growth are not only local, but cross jurisdictional boundaries through waterways, air quality and energy consumption, and regional economic development. Only a regional approach to addressing these impacts can result in a comprehensive solution. This emphasizes the need for a collaborative process to understand how local actions can affect larger geographic areas and vice versa. Coordinated improvements to the passenger rail system and other transportation networks can help to alleviate some of the potentially negative effects of growth.

Redundancy

In addition to environmental and economic considerations, transportation redundancy is needed to address safety and security considerations and to support overall improvements to the Northeast's transportation system. Rail network redundancy is critical to safe, efficient and reliable rail operations in the corridor. In the event of the unforeseen loss of essential network links, the availability of redundant components provides the necessary back-up that can maintain the services on which the economies of the larger, more rail-dependent urban areas depend. In addition, redundant network elements greatly facilitate completion of extensive improvements to often 100+ year-old infrastructure (e.g., the North River Tunnels into Manhattan) that would otherwise result in extensive delays and higher costs for these activities.

[52] Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 27*, ORNL-6981 (prepared for the U.S. Department of Energy, 2008).
[53] Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 27*, ORNL-6981 (prepared for the U.S. Department of Energy, 2008).
[54] Texas Transportation Institute (TTI), *2011 Urban Mobility Report* (September 2012); ACRP, "ACRP Report #31."
[55] Congestion cost is calculated using the value of travel time delay and excess fuel consumption.
[56] TTI, *Urban Mobility Report.*
[57] "Commuter Train Derails under Hudson River in New York City Disrupts Trains Throughout the Northeast," *Washington Post*, August 9, 2011.
[58] Newark Regional Business Partnership, *Northeast Corridor Action Plan: A Call for a New Federal-State Partnership* (prepared by Alan Voorhees Transportation Center of Rutgers and Hamilton, Rabinovitz & Alschuler, Inc.).
[59] Moody's Analytics, Inc., 2010.
[60] I-95 Corridor Coalition, Northeast Rail Operations Study (NEROps) Phase 1 Final Report (June 2007), http://i95coalition.org/i95/Portals/0/Public_Files/pm/reports/_NEROps-Final-Report_COMPLETE_071607.pdf.
[61] Moody's Analytics, Inc. "Model Methodology: The Moody's Analytics U.S. State Economic Model System" (January 2011).

2.3 PROGRAM GOALS AND OBJECTIVES

The NEC FUTURE Goals and Objectives will form the basis for evaluating and screening alternatives and eventually recommending a Preferred Alternative. As such, the program goals must broadly define those elements that proposed alternatives should possess to best address identified needs and meet the program purpose. In light of the critical role that the NEC and its connecting corridors play in the overall mobility and economic vitality of the Northeast, the program goals must reflect not only a long-term vision and roadmap for future investment, but a phased approach to implementing those more urgent, shorter term improvements necessary to meet current capacity requirements. Similarly, the program goals and objectives must recognize the complex mix of ownership and service provider needs ranging from high-speed intercity travel to daily commuter services and goods movement.

Seven goals and supporting objectives have been developed to address the market growth, transportation network capacity, reliability, connectivity, and other needs of NEC FUTURE articulated in Section 2. While the program goals more broadly define those elements that proposed alternatives should possess, the objectives provide established metrics for fair comparison across the range of alternatives to gauge their potential to meet the purpose of the investment program. These broad goals and specific objectives will continue to be refined through dialogue with the stakeholders, agencies and the public during the program Scoping process to provide the basis for evaluating whether identified alternatives meet the overall purpose and need for the program. The seven goals and objectives of the overall program are to:

- Develop a NEC rail network that is part of an integrated comprehensive passenger rail transportation solution for the Northeast and complements planned investments in other modes serving the region.
- Develop program alternatives that would provide attractive, competitive, high-quality passenger rail service that offers customers:
  - Capacity (frequency, train seating) to meet growing demand
  - Improved connectivity (timed connections, network integration, station design, multimodal access)
  - Competitive travel times
  - High levels of reliability
  - Safe and secure travel
  - Convenient and fare-competitive service
  - A user-friendly system
- Define a network that strengthens intermodal connections between intercity passenger rail modes and corridors, regional and local transit services, and other modes.
- Produce a market-supported intercity rail investment plan that provides near- and long-term solutions to the Northeast region's mobility problems and supports the region's ability to meet expanding freight rail demand.
- Create a phased improvement program that reflects funding and financial limitations as well as the challenges of improving the existing corridor under full operation.
- Establish an intercity rail investment plan that supports the Northeast region's need to reduce environmental impacts and energy use resulting from projected growth in travel demand.
- Produce a cost-effective investment plan that identifies and encourages private sector involvement in future corridor improvements and operations.

2.4 PLANNING CONTEXT

The 2008 Passenger Rail Investment and Improvement Act (PRIIA) and the 2009 American Recovery and Reinvestment Act (ARRA) established guidelines for the funding and development of intercity and high-speed rail corridors in the U.S. On April 1, 2010, the FRA published the FY 2010 Multi-State Planning Proposal Solicitation under the High-Speed Intercity Passenger Rail (HSIPR) Program, inviting proposals for federally-led, multi-state high-speed and intercity passenger rail corridor planning demonstration projects.[62] The FRA received proposals from various groups of states and a proposal submitted collectively by the NEC states was selected by the FRA to fund and advance a PRCIP for the NEC.

[62] In the FY 2010 Department of Transportation Appropriations Act, Congress supported the use of planning funds to facilitate development of a Service Development Plan (SDP) and related Environmental Impact Statement (EIS) for high-speed rail corridors located in multiple states.

Appendix B. List of Initial Alternatives

This Appendix B provides a list of the Initial Alternatives for NEC FUTURE and a description of the terms used to describe the components of each alternative.

B.1 OVERALL APPROACH TO INITIAL ALTERNATIVES

For the purposes of organizing the list of Initial Alternatives, it is convenient to compile the alternatives separately for the "North End" and "South End" of the Northeast Corridor (NEC) with New York City as the North/South dividing line. New York City is the dominant market in the Northeast Megaregion, and will be served with service to and through New York.

At this phase, Initial Alternatives do not include detailed characterizations of the physical and operational aspects of the railroad systems operating within the NEC Study Area, such as detailed alignments, track configurations, specific capital projects, operating plans, train timetables, identification of specific station locations, rolling stock fleet plans, etc. These items may be developed and evaluated in future phases of this or other projects.

Table B-1 lists 98 Initial Alternatives. Each row of the table represents a unique alternative, with the columns of the table representing the components or features of the alternative.

B.2 TERMS USED TO DESCRIBE COMPONENTS OF ALTERNATIVES

Alternatives are described by four components that respond to market demand.

B.2.1 Route (Markets Served)

Describes a general path for the fastest end-to-end route and the markets served by that route. Does NOT refer to any specific alignment or right-of-way configuration. Routes are more general than a specific right-of-way configuration or infrastructure footprint. All alternatives include the existing NEC and may include an additional alignment.

B.2.2 Program Investment Level

Program Investment level answers the question: How robust of vision for passenger rail is planned and, based on that vision, how much rail service can be provided to serve the markets? The amount of available funding drives the ability to add the capacity to support additional rail operations and service to new markets. The larger the investment in building the capacity of the rail line—its tracks, signal systems, bridges, station platforms and equipment—the more trains that can serve a market.

NEC FUTURE applied four program levels—a low Baseline level, two medium levels (Baseline Plus and Medium) and High—to broadly test investment options in the NEC over the next 30 years. This results in a range of alternatives from continuation of today's rail operations at the low end to the ability to provide significantly enhanced and robust service, including service to new markets and

high-speed rail options at the high end. The four levels of investment used for the Initial Alternatives were as follows:[1]

- Baseline: Responds to projected 2040 demand in existing markets using existing infrastructure; achieves State-of-Good-Repair
- Baseline-Plus: Meets projected 2040 demand in existing markets; includes investments to optimizes the potential of existing NEC spine
- Medium: Expands capacity to accommodate targeted new service , new markets and additional growth
- High: Major increase in quantity and type of service on the NEC spine and construction of a new HSR alignment

B.2.3 Service Definition/Operational Environment

Describes the type of rail service that is provided, in three general categories: These categories are presented in the Initial Alternatives as distinct options and when combined with the Service Focus element, define the full range of potential service options for the study area. Current Mix forms the baseline for analyzing the impacts of the other service strategies. Simplified Service Mix and Expanded One-Seat Ride will be used to test the wide range of reasonable service options.

These service strategies are intended to guide the development of potential service options for the alternatives. Their features are not intended to be absolute or exclusive to each service strategy. As the alternatives are refined in future phases of work, features from each of these service strategies may be combined to develop the best service plan for an alternative.

Various "connection strategies" – such as coordinated transfers or run-through service from connecting corridors – will be applied to each service strategy to ensure that all potential market pairs in the study area are served.

- **Current Mix:** Includes the current "mix" of train types (Acela/Premium High-Speed Rail, Regional/Limited Intercity, Commuter, Freight) and institutional arrangements with the number of trains increased as needed to meet future demand. The service would still have a mix of train types, but the proportional mix would be "rebalanced" to respond to market demand.
- **Enhanced Service Mix:**
  - Simplified Service :
    - Provides a limited group of services on a regular, repeating schedule to deliver higher frequency and throughput capacity than service plans with a greater variety of stopping patterns and train types.
    - May not deliver same trip times to major markets and may require transfers for passengers in secondary markets, but overall trip times are competitive with other

[1] For simplicity, the nomenclature for the Program Investment Levels will be changed during the development of the Preliminary Alternatives and in the Preliminary Alternatives Report to the following: A (Low); B (Medium-Low); C (Medium-High) ; and D (High).

service approaches with opportunity for greater frequencies to secondary markets through highly coordinated schedules and transfers.

- Services include:
  - Limited-stop express service
  - Multi-stop local service
  - Supplemental peak commuter service
  - Convenient transfers from connecting corridors to and between services on NEC Spine

– Expanded One-Seat Ride: Focuses on maximizing the number of market pairs served with one-seat ride service, particularly for intermediate and connecting corridor markets, through the use of several services. These services include high-speed trains operating exclusively on high-speed or express tracks and other high-performance services that share high-speed tracks and utilize available capacity on portions of high-speed territory with maximum speeds of 160 mph or less and without intermediate station stops (e.g., on final approach to NYC, Washington and/or Boston).

B.2.4 Service Focus

Describes the following types of passenger and/or geographic markets that are the focus of the alternative:

- **Regional markets:** Shorter-distance travel (within a single metropolitan area or to a neighboring metropolitan area) generally on a daily or nearly daily basis
- **Intercity primary markets:** Travel between primary markets (Boston, New York, Philadelphia, and Washington, DC) for any trip purpose
- **Intercity secondary markets:** All other intercity travel between markets located on the existing NEC Spine or on a new route for any trip purpose. (Secondary markets are NEC markets/cities other than the primary markets between Boston, New York, Philadelphia, and Washington DC.)
- **Connecting corridor markets:** Intermediate-distance markets that are not on the NEC Spine but can reach markets on the NEC Spine or new route either directly or by one transfer

As noted in the main report, Service Focus is useful in organizing the Initial Alternatives but will be combined within Service Definition during development of the Preliminary Alternatives.

B.3 COMBINATIONS OF ELEMENTS TO CREATE ALTERNATIVES

B.3.1 Alternatives that Follow the Existing NEC Spine

Using this approach of combining elements to create unique alternatives, 28 alternatives north of New York and 28 alternatives south of New York were defined that follow the existing NEC spine. These consist of combinations of Quantity of Service, Service Strategy, and Service Focus.

B.3.2 Alternatives with a Portion of the Route off the Existing NEC Spine

Alternatives serving markets off of the existing NEC spine will require new infrastructure and new alignments. While very costly, new routes provide the ability to deliver substantive service improvements for all users of the rail line. Accordingly, the alternatives that do not follow the existing NEC route are assumed to provide a high quantity of service and to benefit all rail markets. Forty-two (42) alternatives were defined where a portion of the alignment is off of the existing NEC spine. All of those 42 alternatives still include the existing NEC. .

B.3.3 Summary

In total, 98 separate Initial Alternatives were identified, and they are listed in Table B-1. Each alternative represents a unique combination of geographical, market, service and investment needs. These alternatives include those generated through the data collection process and those raised during scoping that reasonably help to address one or more objectives of the Purpose & Need.

Following Table B-1, a set of fact sheets describes each of the Initial Alternatives in greater detail.

TABLE B-1: INITIAL ALTERNATIVES

Alternative ID	Route	Program Investment Level	Service Definition/Operational Environment	Service Focus
North1	Existing NEC	Baseline	Current Mix	Regional
North2	Existing NEC	Baseline Plus	Current Mix	Intercity Primary
North3	Existing NEC	Baseline Plus	Current Mix	Intercity Secondary
North4	Existing NEC	Baseline Plus	Current Mix	Regional
North5	Existing NEC	Baseline Plus	Current Mix	Connecting
North6	Existing NEC	Baseline Plus	Simplified Service	Intercity Primary
North7	Existing NEC	Baseline Plus	Simplified Service	Intercity Secondary
North8	Existing NEC	Baseline Plus	Simplified Service	Regional
North9	Existing NEC	Baseline Plus	Simplified Service	Connecting
North10	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Intercity Primary
North11	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Intercity Secondary
North12	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Regional
North13	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Connecting
North14	Existing NEC	Medium	Current Mix	Intercity Primary
North15	Existing NEC	Medium	Current Mix	Intercity Secondary
North16	Existing NEC	Medium	Current Mix	Regional
North17	Existing NEC	Medium	Current Mix	Connecting
North18	Existing NEC	Medium	Simplified Service	Intercity Primary
North19	Existing NEC	Medium	Simplified Service	Intercity Secondary
North20	Existing NEC	Medium	Simplified Service	Regional
North21	Existing NEC	Medium	Simplified Service	Connecting
North22	Existing NEC	Medium	Expanded One-Seat Ride	Intercity Primary
North23	Existing NEC	Medium	Expanded One-Seat Ride	Intercity Secondary
North24	Existing NEC	Medium	Expanded One-Seat Ride	Regional
North25	Existing NEC	Medium	Expanded One-Seat Ride	Connecting
North26	Existing NEC	High	Current Mix	All Markets
North27	Existing NEC	High	Simplified Service	All Markets
North28	Existing NEC	High	Expanded One-Seat Ride	All Markets

TABLE B-1: INITIAL ALTERNATIVES (CONTINUED)

Alternative ID	NEC Spine Route	Quantity of Service	Service Strategy	Service Focus
North29	New Haven Line - Central CT	High	Current Mix	All Markets
North30	New Haven Line - Central CT	High	Simplified Service	All Markets
North31	New Haven Line - Central CT	High	Expanded One-Seat Ride	All Markets
North32	New Haven Line - via Springfield	High	Current Mix	All Markets
North33	New Haven Line - via Springfield	High	Simplified Service	All Markets
North34	New Haven Line - via Springfield	High	Expanded One-Seat Ride	All Markets
North35	Central CT - via Providence	High	Current Mix	All Markets
North36	Central CT - via Providence	High	Simplified Service	All Markets
North37	Central CT - via Providence	High	Expanded One-Seat Ride	All Markets
North38	Central CT - via Worcester	High	Current Mix	All Markets
North39	Central CT - via Worcester	High	Simplified Service	All Markets
North40	Central CT - via Worcester	High	Expanded One-Seat Ride	All Markets
North41	Central CT - via Springfield	High	Current Mix	All Markets
North42	Central CT - via Springfield	High	Simplified Service	All Markets
North43	Central CT - via Springfield	High	Expanded One-Seat Ride	All Markets
North44	Nassau-Suffolk - Shore Line	High	Current Mix	All Markets
North45	Nassau-Suffolk - Shore Line	High	Simplified Service	All Markets
North46	Nassau-Suffolk - Shore Line	High	Expanded One-Seat Ride	All Markets
North47	Nassau-Suffolk - Central CT	High	Current Mix	All Markets
North48	Nassau-Suffolk - Central CT	High	Simplified Service	All Markets
North49	Nassau-Suffolk - Central CT	High	Expanded One-Seat Ride	All Markets
North50	Nassau-Suffolk - via Worcester	High	Current Mix	All Markets
North51	Nassau-Suffolk - via Worcester	High	Simplified Service	All Markets
North52	Nassau-Suffolk - via Worcester	High	Expanded One-Seat Ride	All Markets
North53	Nassau-Suffolk - via Springfield	High	Current Mix	All Markets
North54	Nassau-Suffolk - via Springfield	High	Simplified Service	All Markets
North55	Nassau-Suffolk - via Springfield	High	Expanded One-Seat Ride	All Markets
North56	Nassau-Stamford - Central CT	High	Current Mix	All Markets
North57	Nassau-Stamford - Central CT	High	Simplified Service	All Markets

TABLE B-1: INITIAL ALTERNATIVES (CONTINUED)

Alternative ID	NEC Spine Route	Quantity of Service	Service Strategy	Service Focus
North58	Nassau-Stamford - Central CT	High	Expanded One-Seat Ride	All Markets
North59	Nassau-Stamford - via Worcester	High	Current Mix	All Markets
North60	Nassau-Stamford - via Worcester	High	Simplified Service	All Markets
North61	Nassau-Stamford - via Worcester	High	Expanded One-Seat Ride	All Markets
North62	Nassau-Stamford - via Springfield	High	Current Mix	All Markets
North63	Nassau-Stamford - via Springfield	High	Simplified Service	All Markets
North64	Nassau-Stamford - via Springfield	High	Expanded One-Seat Ride	All Markets
South1	Existing NEC	Baseline	Current Mix	Regional
South2	Existing NEC	Baseline Plus	Current Mix	Intercity Primary
South3	Existing NEC	Baseline Plus	Current Mix	Intercity Secondary
South4	Existing NEC	Baseline Plus	Current Mix	Regional
South5	Existing NEC	Baseline Plus	Current Mix	Connecting
South6	Existing NEC	Baseline Plus	Simplified Service	Intercity Primary
South7	Existing NEC	Baseline Plus	Simplified Service	Intercity Secondary
South8	Existing NEC	Baseline Plus	Simplified Service	Regional
South9	Existing NEC	Baseline Plus	Simplified Service	Connecting
South10	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Intercity Primary
South11	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Intercity Secondary
South12	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Regional
South13	Existing NEC	Baseline Plus	Expanded One-Seat Ride	Connecting
South14	Existing NEC	Medium	Current Mix	Intercity Primary
South15	Existing NEC	Medium	Current Mix	Intercity Secondary
South16	Existing NEC	Medium	Current Mix	Regional
South17	Existing NEC	Medium	Current Mix	Connecting
South18	Existing NEC	Medium	Simplified Service	Intercity Primary
South19	Existing NEC	Medium	Simplified Service	Intercity Secondary
South20	Existing NEC	Medium	Simplified Service	Regional
South21	Existing NEC	Medium	Simplified Service	Connecting
South22	Existing NEC	Medium	Expanded One-Seat Ride	Intercity Primary

TABLE B-1: INITIAL ALTERNATIVES (CONTINUED)

Alternative ID	NEC Spine Route	Quantity of Service	Service Strategy	Service Focus
South23	Existing NEC	Medium	Expanded One-Seat Ride	Intercity Secondary
South24	Existing NEC	Medium	Expanded One-Seat Ride	Regional
South25	Existing NEC	Medium	Expanded One-Seat Ride	Connecting
South26	Existing NEC	High	Current Mix	All Markets
South27	Existing NEC	High	Simplified Service	All Markets
South28	Existing NEC	High	Expanded One-Seat Ride	All Markets
South29	Via Downtown Baltimore and Philadelphia	High	Current Mix	All Markets
South30	Via Downtown Baltimore and Philadelphia	High	Simplified Service	All Markets
South31	Via Downtown Baltimore and Philadelphia	High	Expanded One-Seat Ride	All Markets
South32	Delmarva Route via Annapolis	High	Current Mix	All Markets
South33	Delmarva Route via Annapolis	High	Simplified Service	All Markets
South34	Delmarva Route via Annapolis	High	Expanded One-Seat Ride	All Markets

INITIAL ALTERNATIVES FACT SHEETS

Initial Alternative: North1

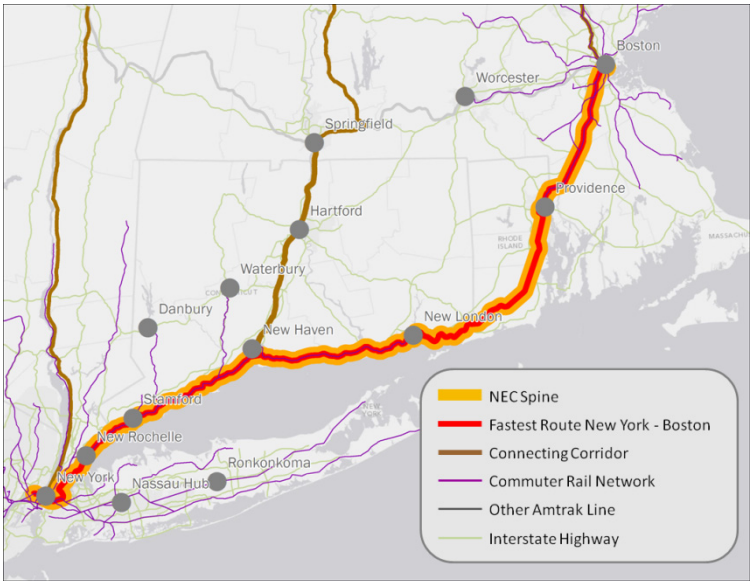
Current Mix of Services with Focus on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline
Service Definition	Current Mix
Service Focus	Regional

Description

Responds to growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North2

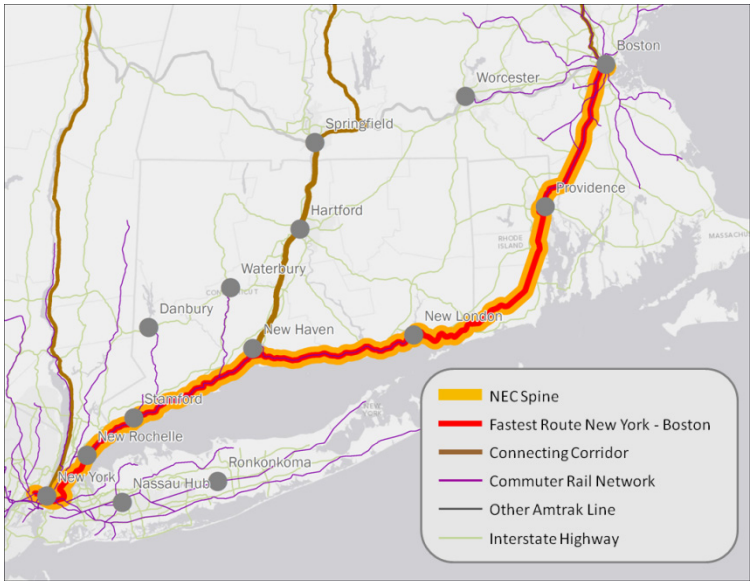
Current Mix of Services with Focus on Primary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Intercity Primary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North3

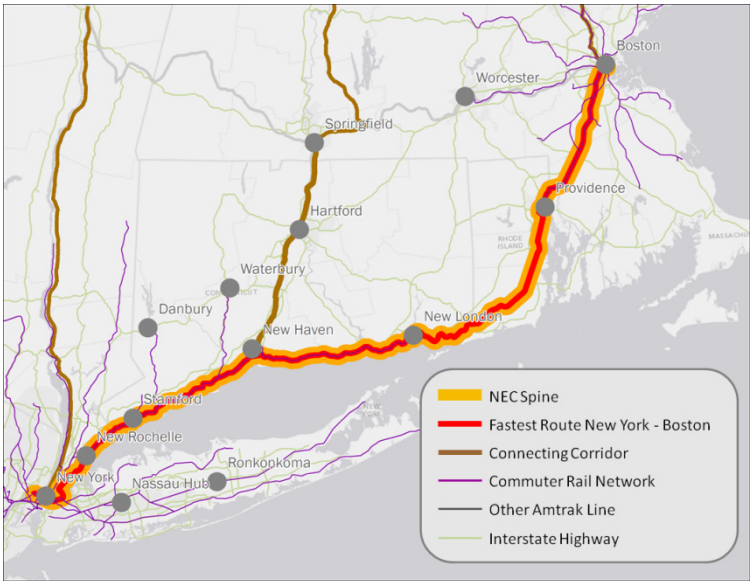
Current Mix of Services with Focus on Secondary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Intercity Secondary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North4

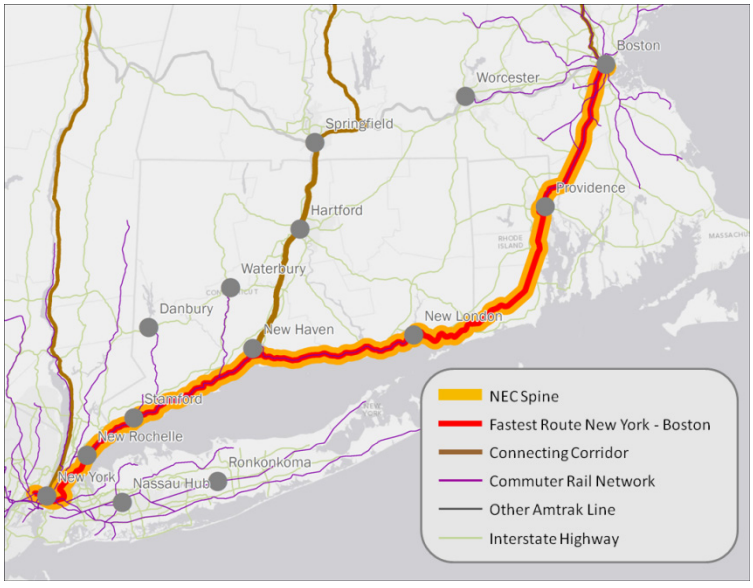
Current Mix of Services with Focus on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Regional

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North5

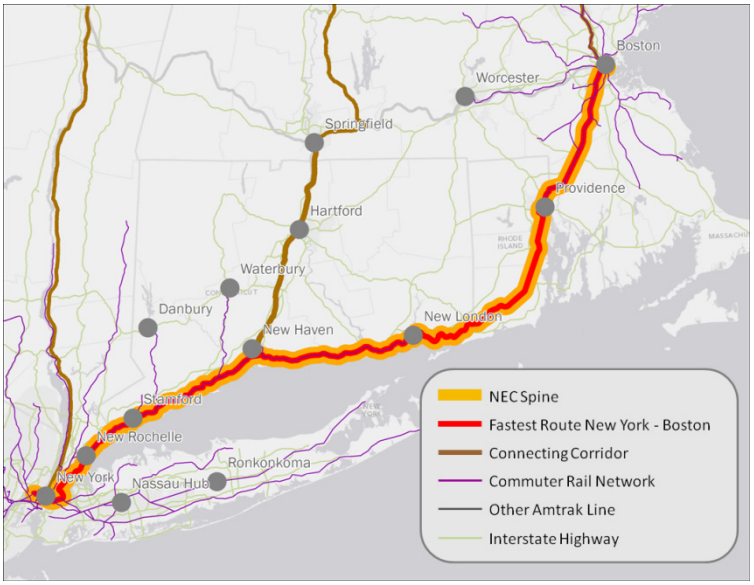
Current Mix of Services with Focus on Connecting Corridors via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Connecting

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North6

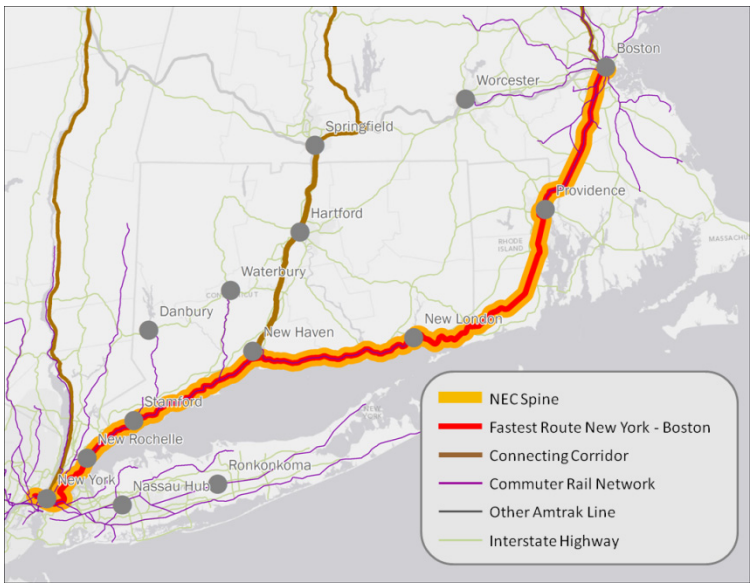
Coordinated, Frequent Service Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Intercity Primary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North7

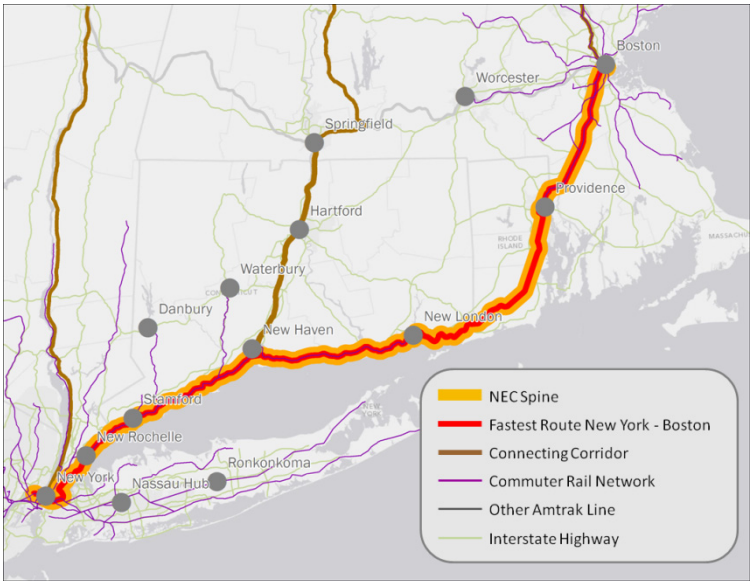
Coordinated, Frequent Service Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Intercity Secondary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North8

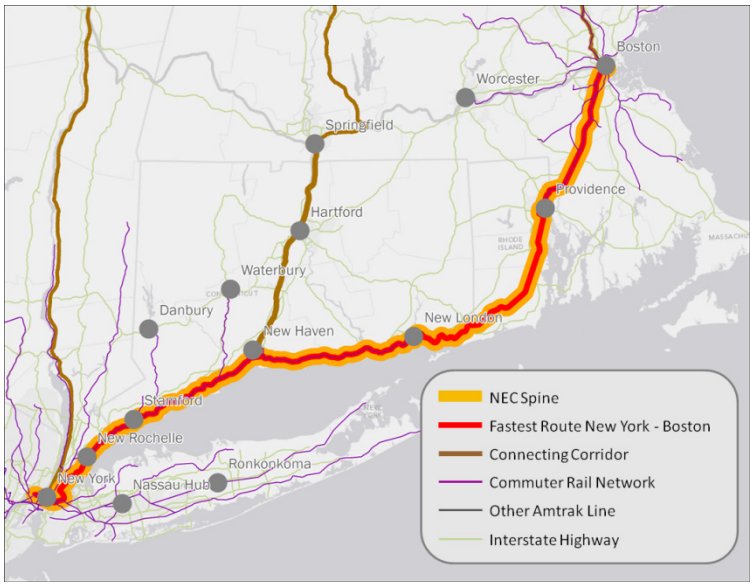
Coordinated, Frequent Service Focused on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Regional

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North9

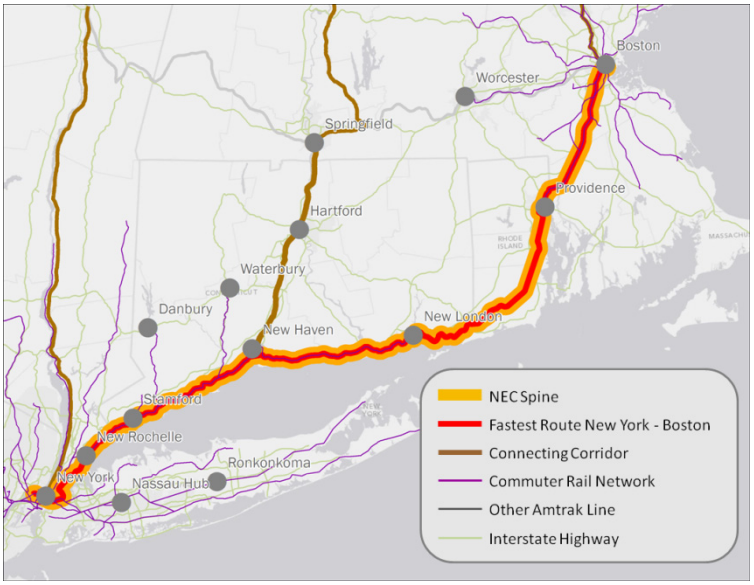
Coordinated, Frequent Service Focused on Connecting Corridors via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Connecting

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North10

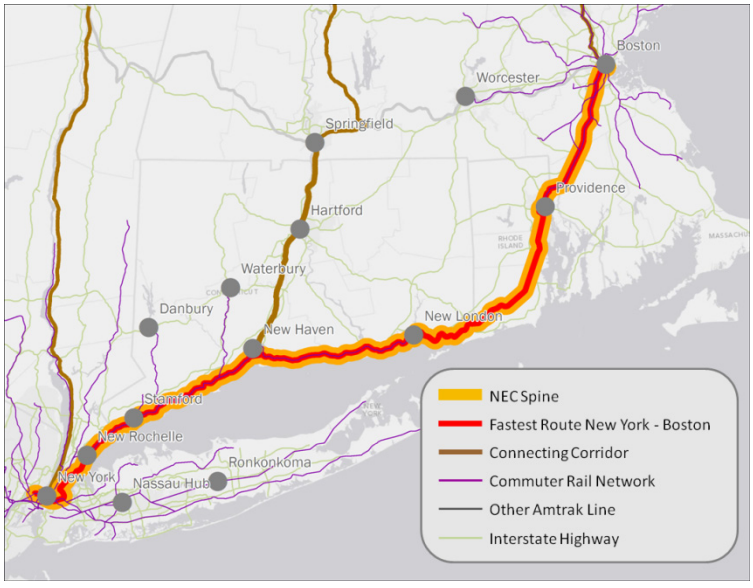
Expanded Mix of Services Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Primary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North11

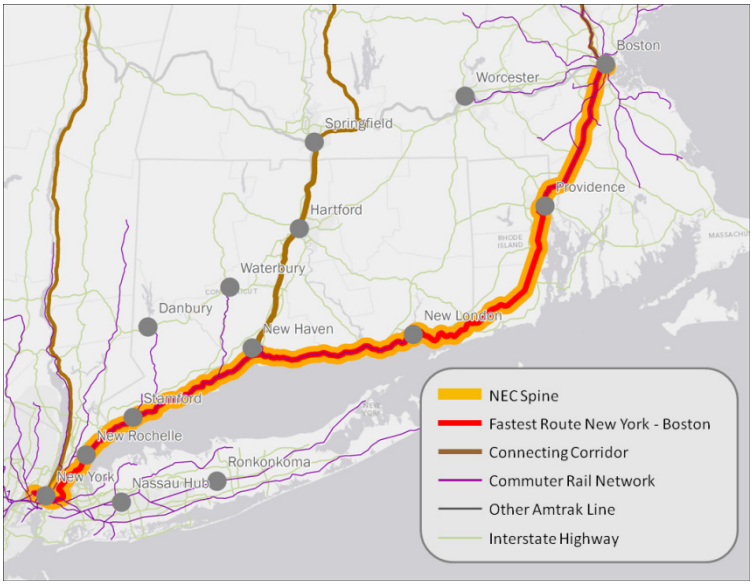
Expanded Mix of Services Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Secondary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North12

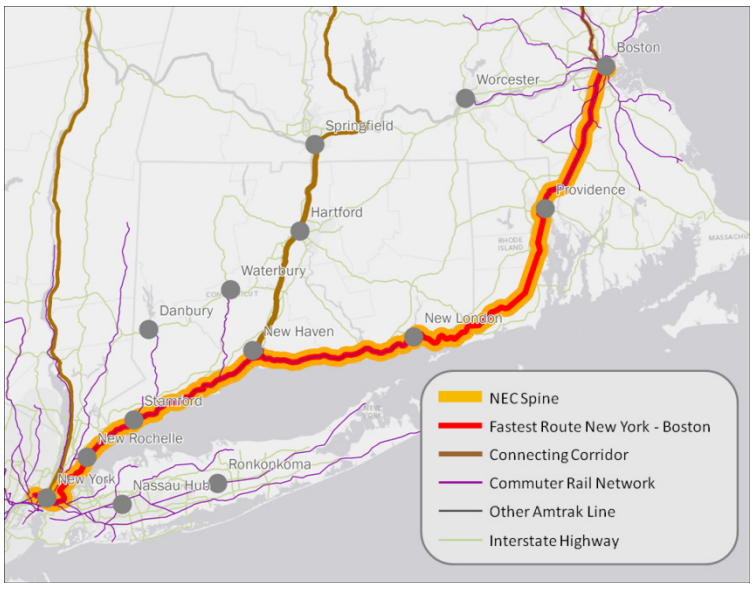
Expanded Mix of Services Focused on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Regional

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North13

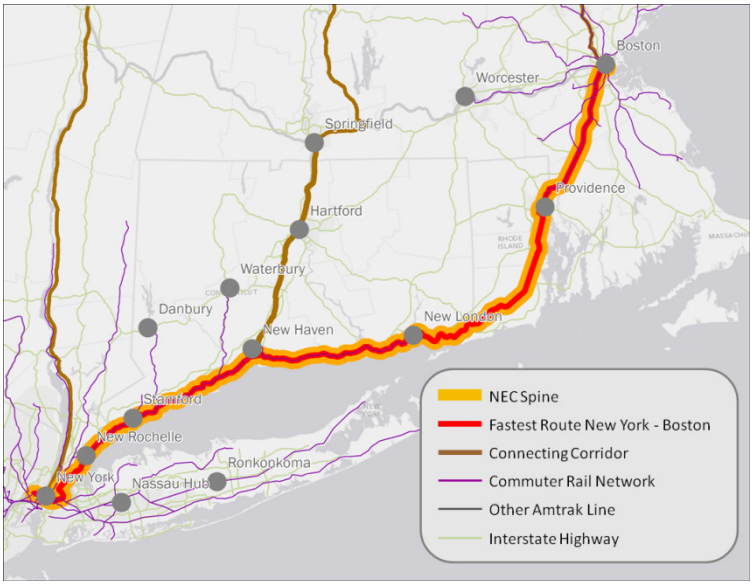
Expanded Mix of Services Focused on Connecting Corridors via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Connecting

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North14

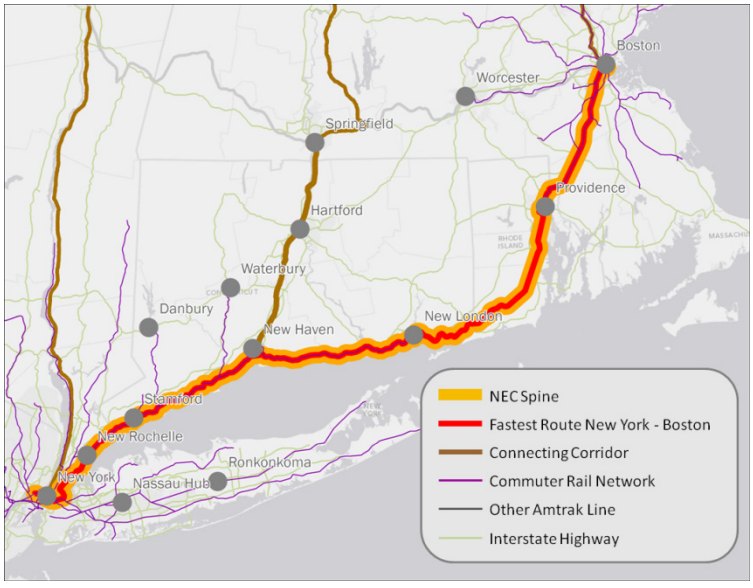
Current Mix of Services with Focus on Primary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Intercity Primary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North15

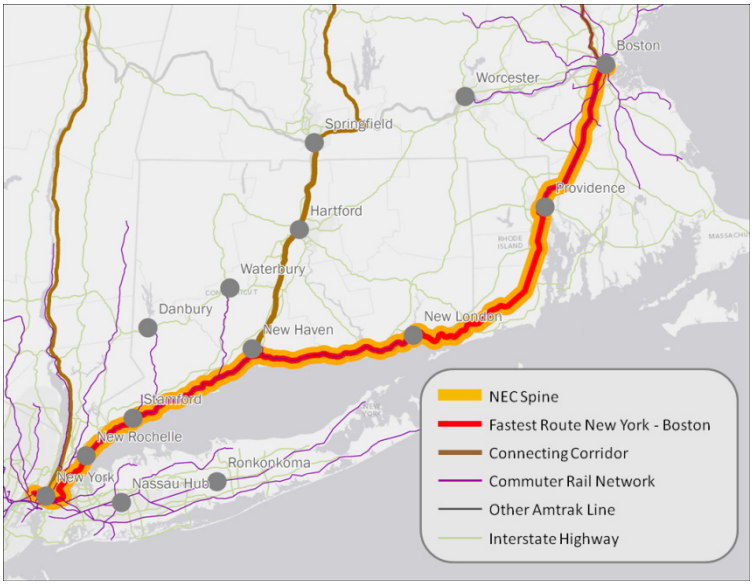
Current Mix of Services with Focus on Secondary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Intercity Secondary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North16

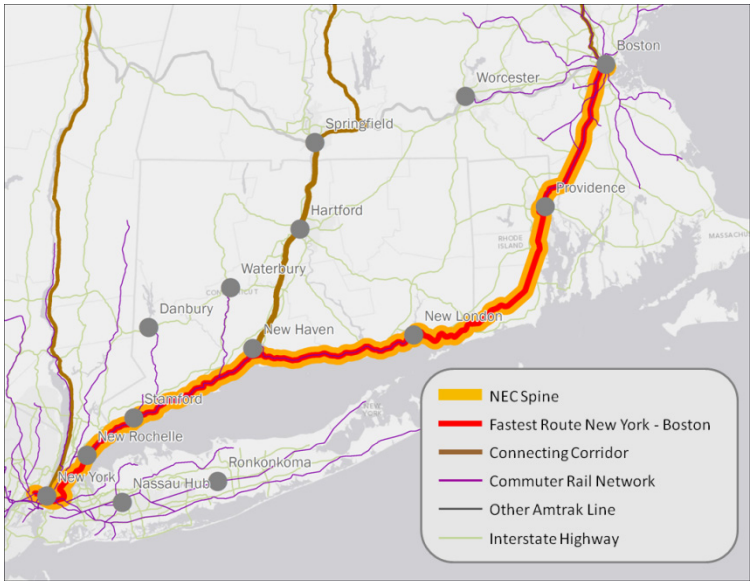
Current Mix of Services with Focus on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Regional

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North17

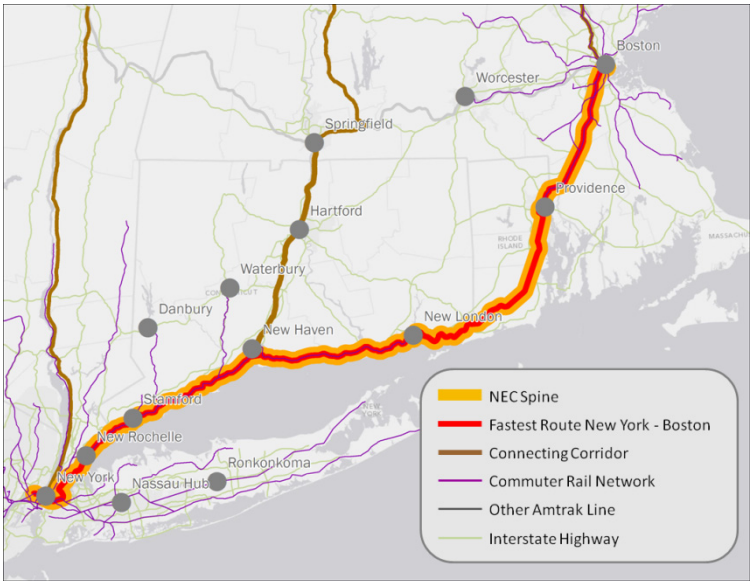
Current Mix of Services with Focus on Connecting Corridors via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Connecting

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: North18

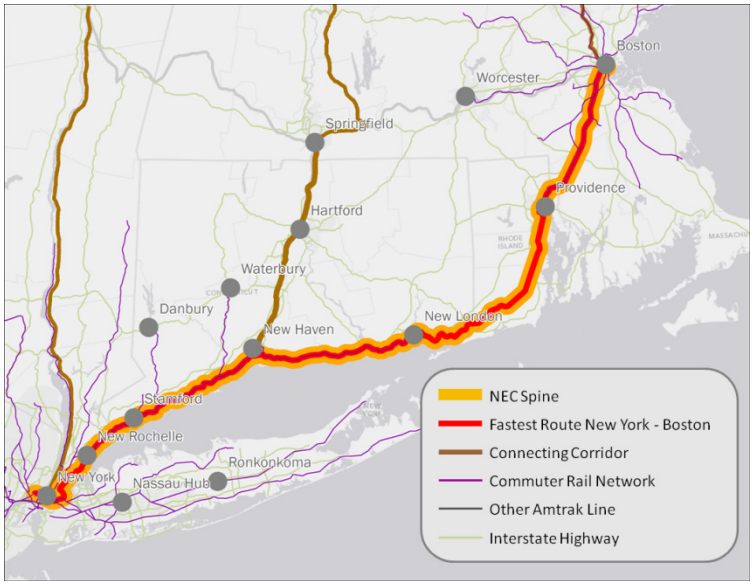
Coordinated, Frequent Service Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Intercity Primary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North19

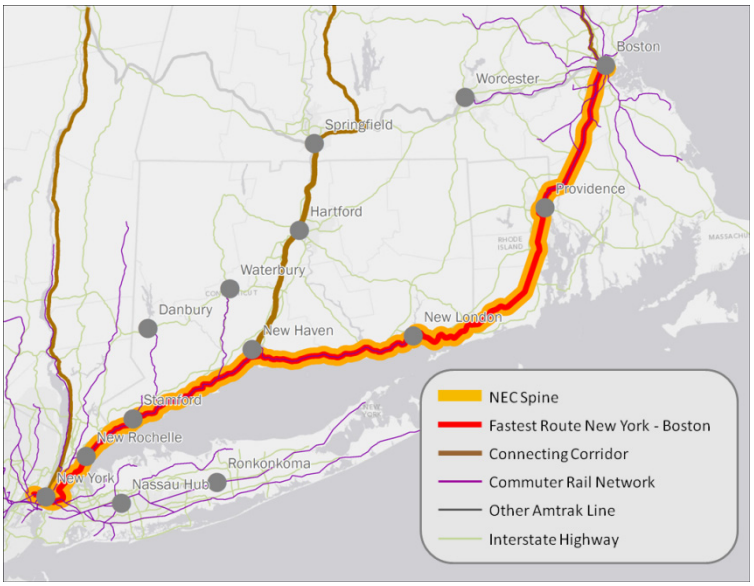
Coordinated, Frequent Service Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Intercity Secondary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North20

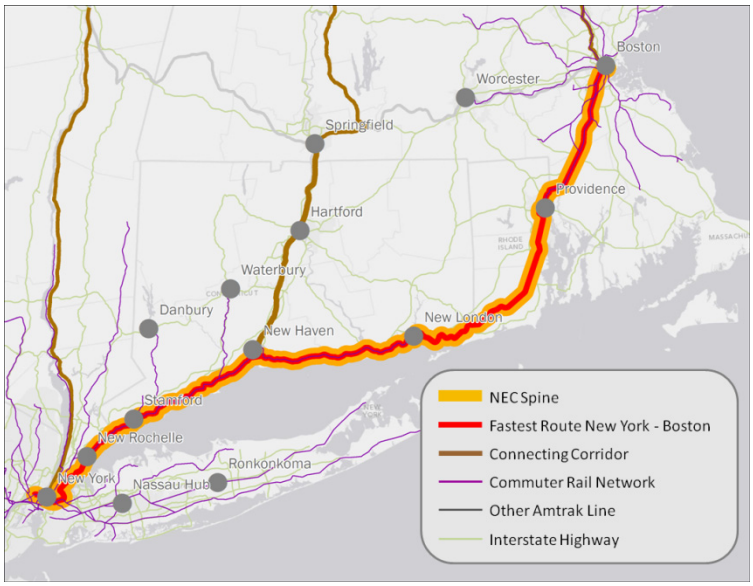
Coordinated, Frequent Service Focused on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Regional

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North21

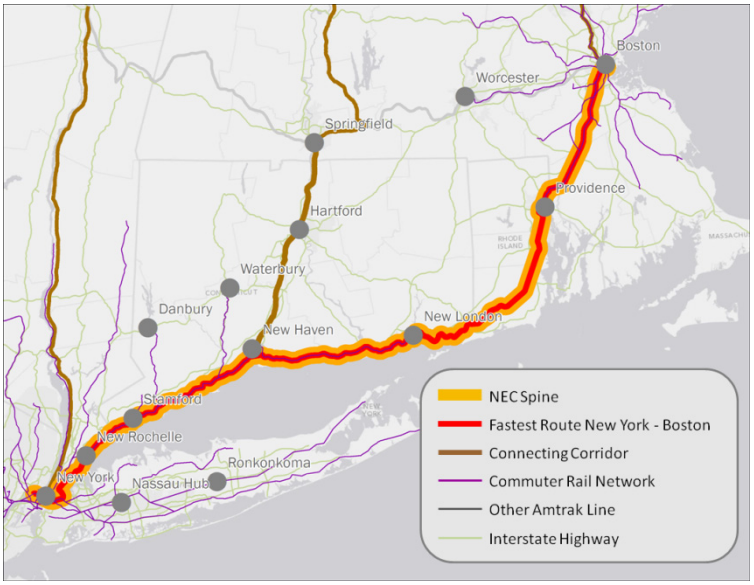
Coordinated, Frequent Service Focused on Connecting Corridors via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Connecting

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North22

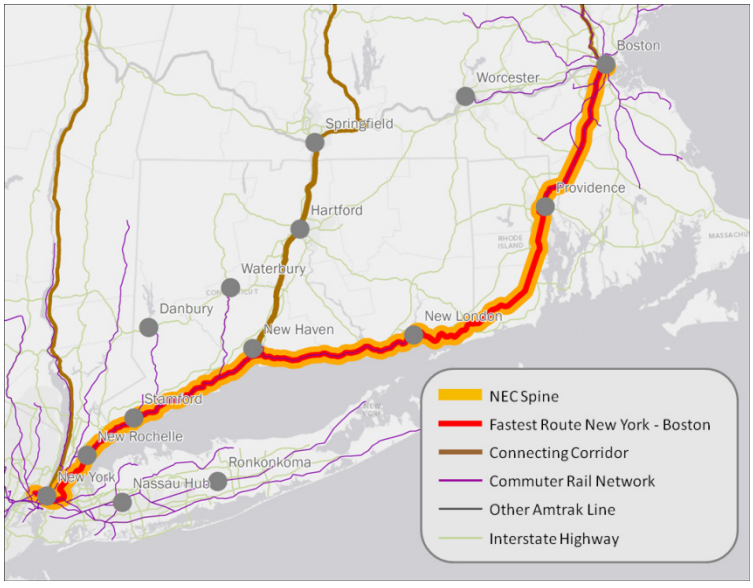
Expanded Mix of Services Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Primary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.

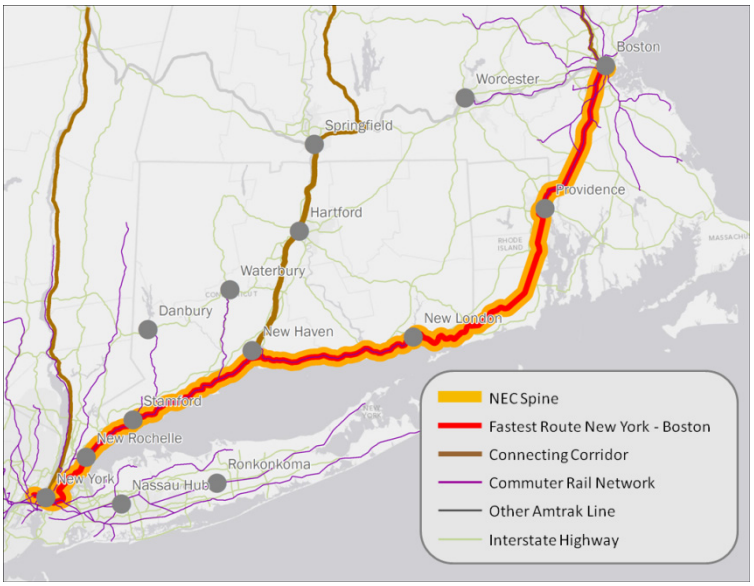


Initial Alternative: North23

Expanded Mix of Services Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Secondary



Description

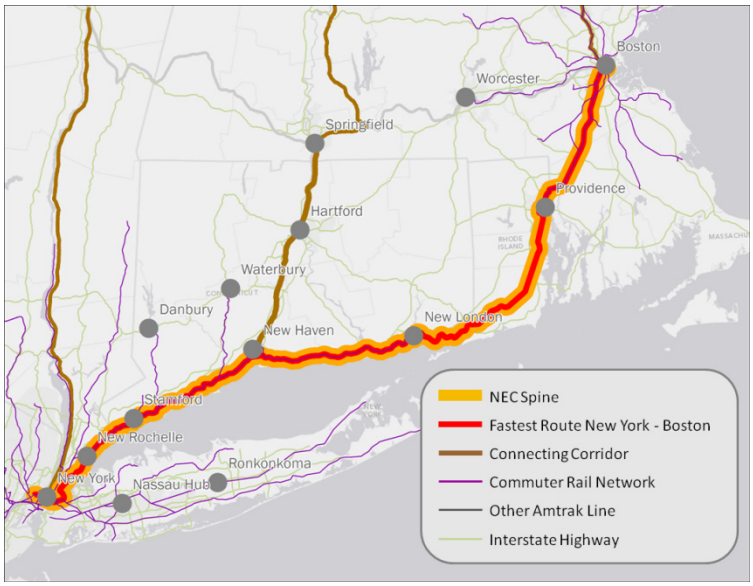
Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North24

Expanded Mix of Services Focused on Regional Service via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Regional



Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North25

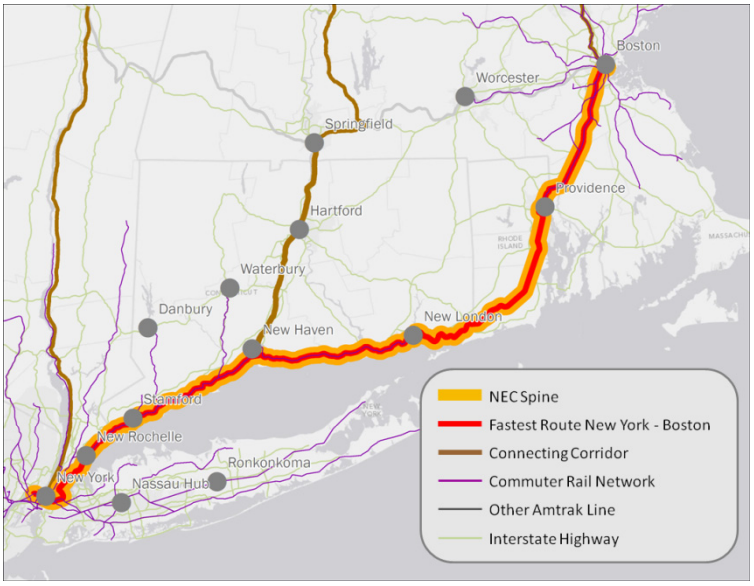
Expanded Mix of Services Focused on Connecting Corridors via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Connecting

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North26

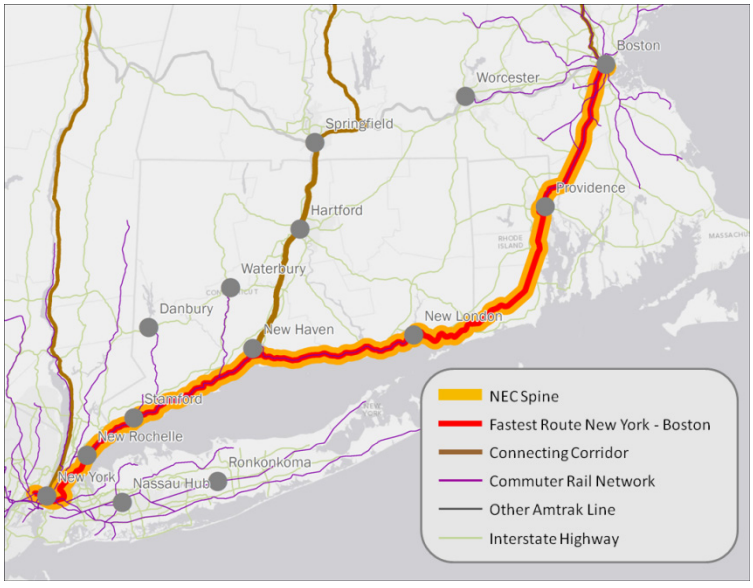
Current Mix of Services with Focus on All Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.



Initial Alternative: North27

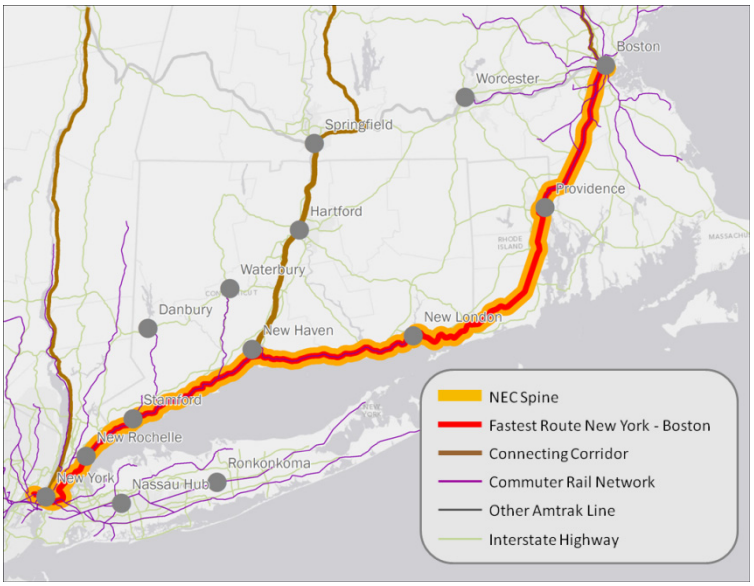
Coordinated, Frequent Service Focused on All Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North28

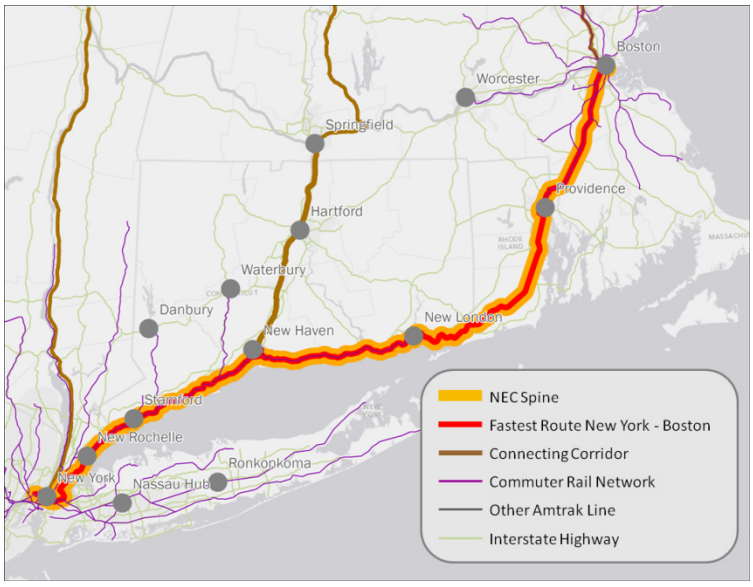
Expanded Mix of Services Focused on All Markets via Existing NEC Alignment between NYC and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

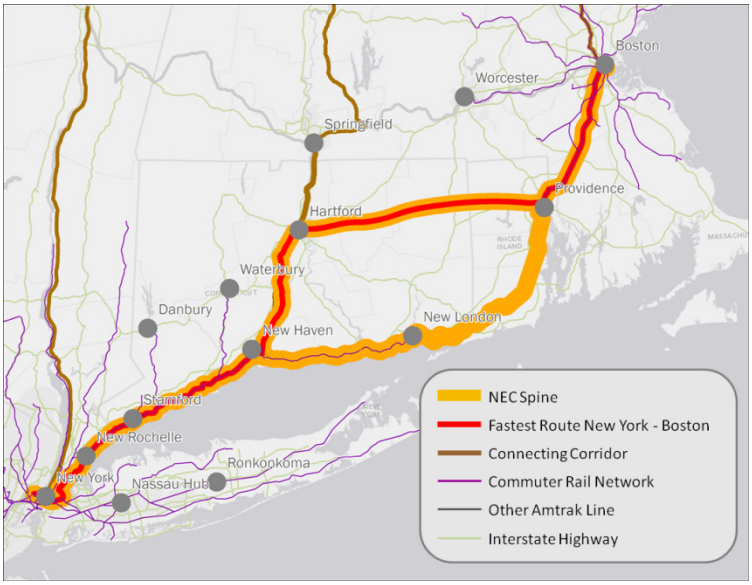


Initial Alternative: North29

Current Mix of Services with Focus on All Markets with New Route Connecting NYC, New Rochelle, New Haven, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

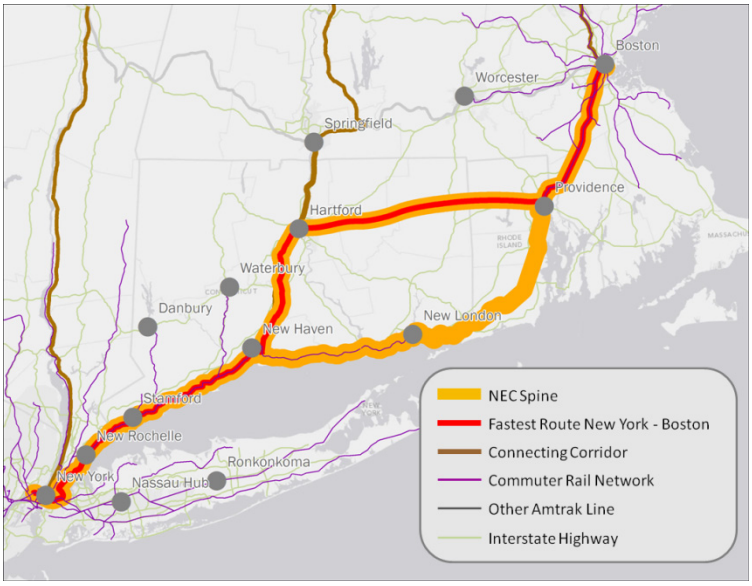
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, New Haven, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: North30

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, New Rochelle, New Haven, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, New Haven, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North31

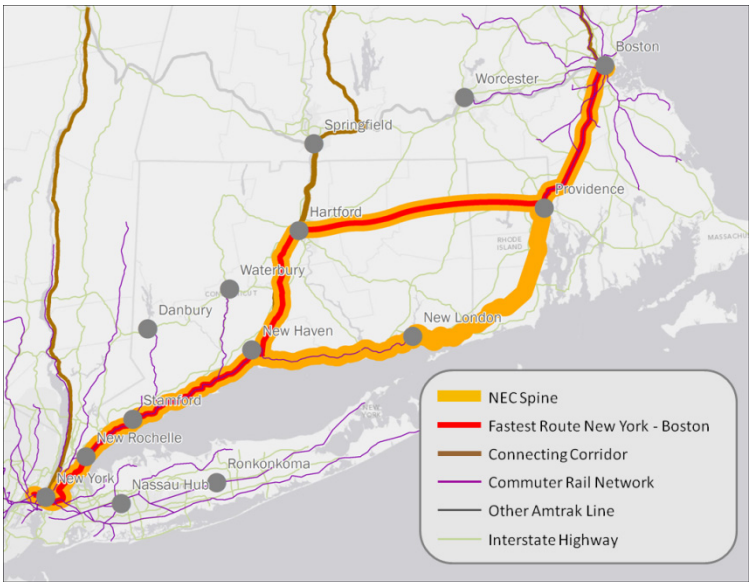
Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, New Rochelle, New Haven, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, New Haven, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North32

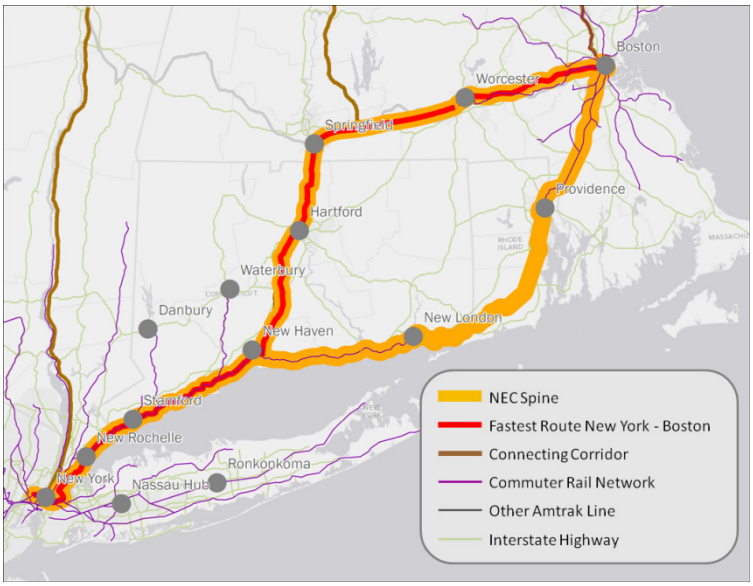
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, New Rochelle, New Haven, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, New Haven, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

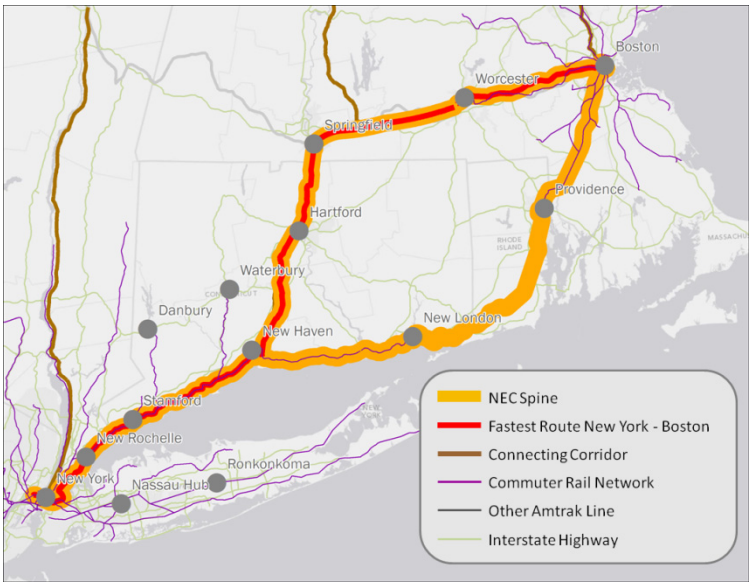


Initial Alternative: North33

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, New Rochelle, New Haven, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

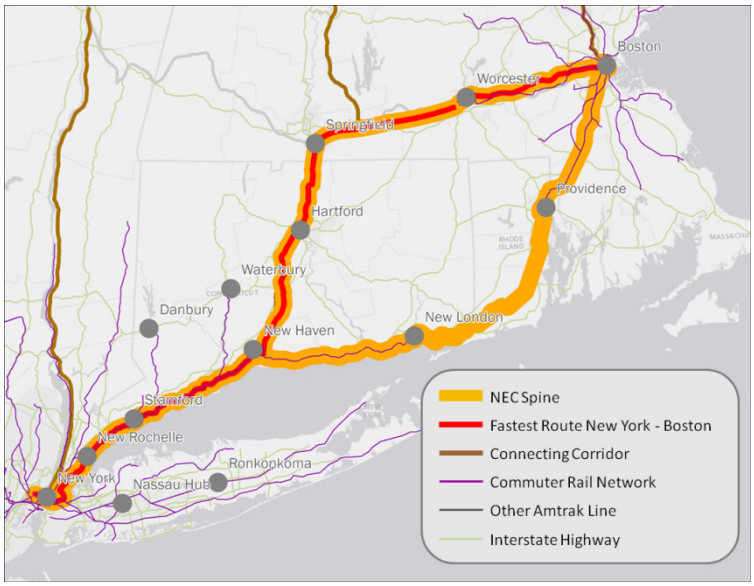
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, New Haven, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North34

Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, New Rochelle, New Haven, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

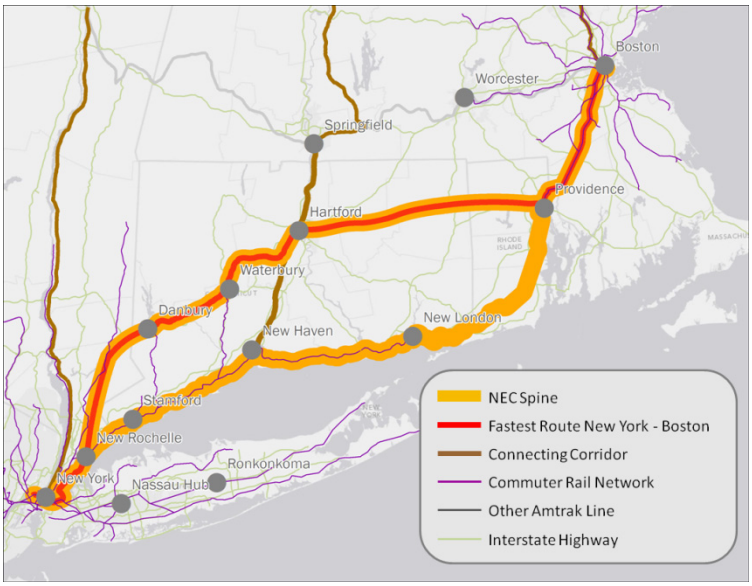
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, New Haven, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North35

Current Mix of Services with Focus on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

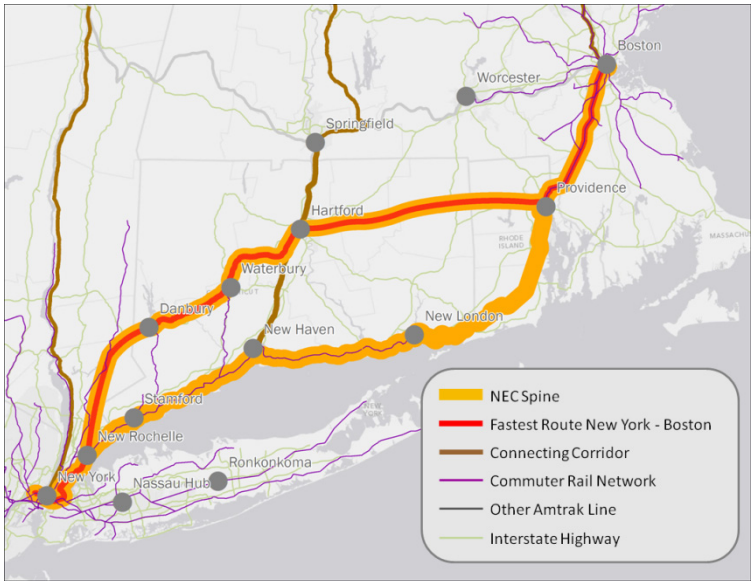
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: North36

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North37

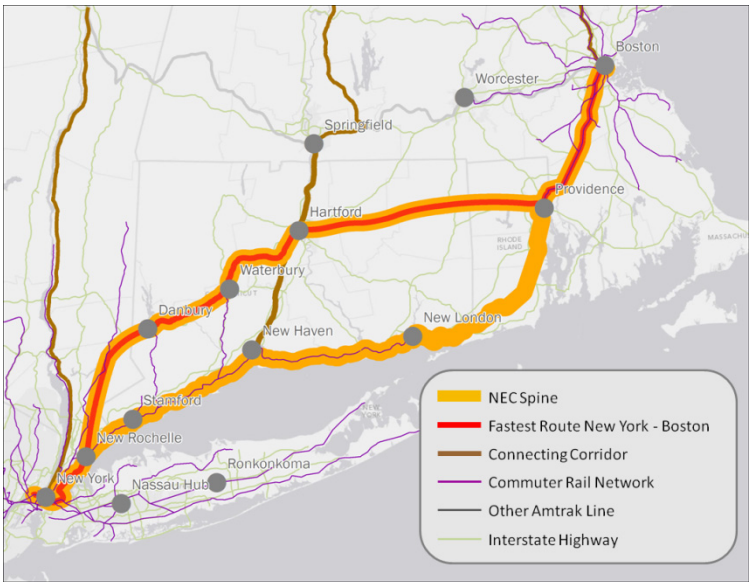
Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North38

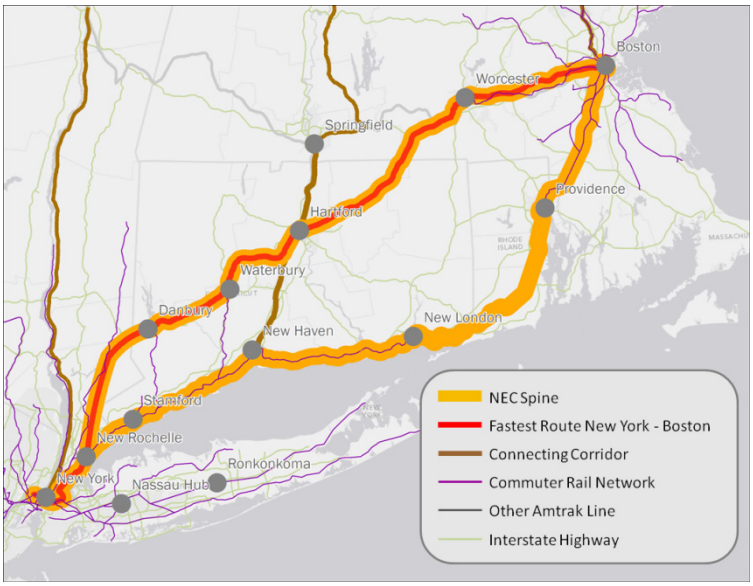
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

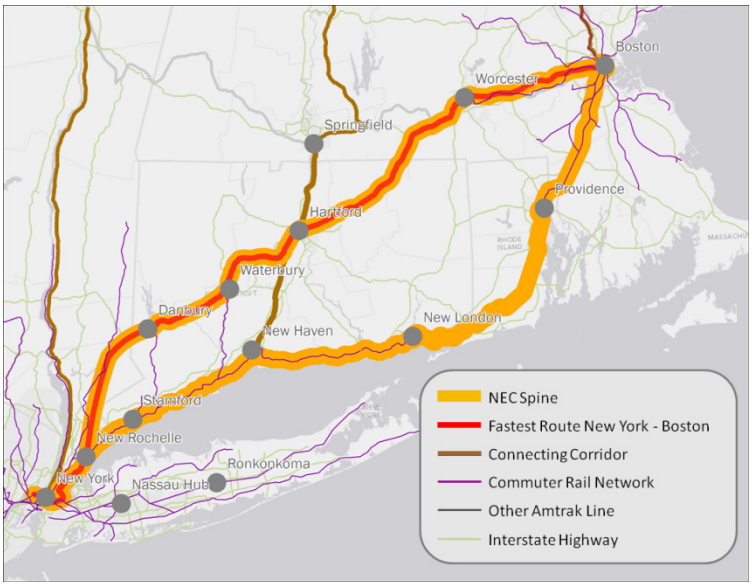


Initial Alternative: North39

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

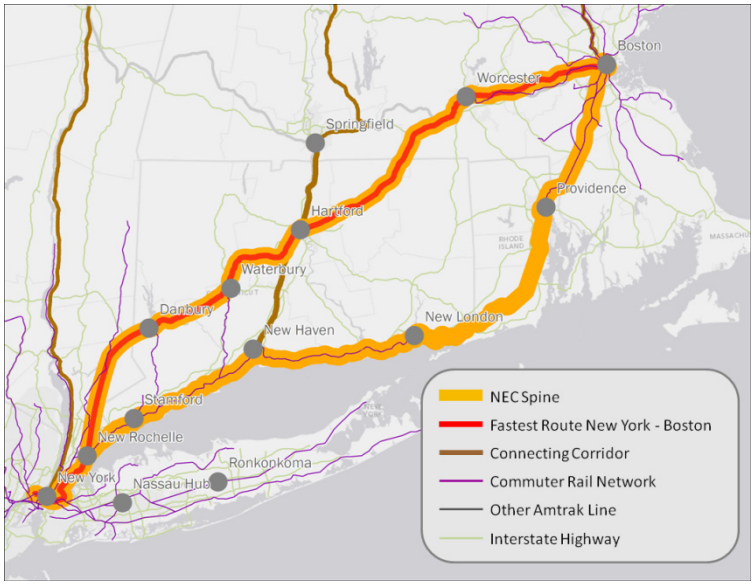
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North40

Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

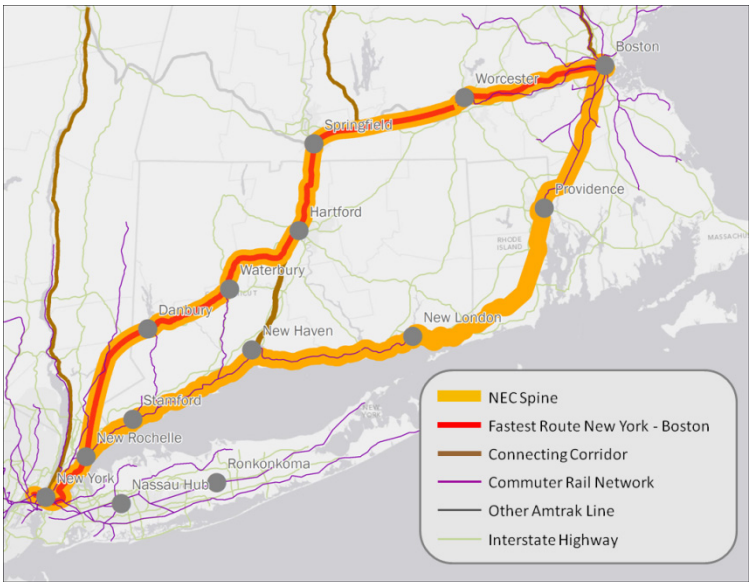
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North41

Current Mix of Services with Focus on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

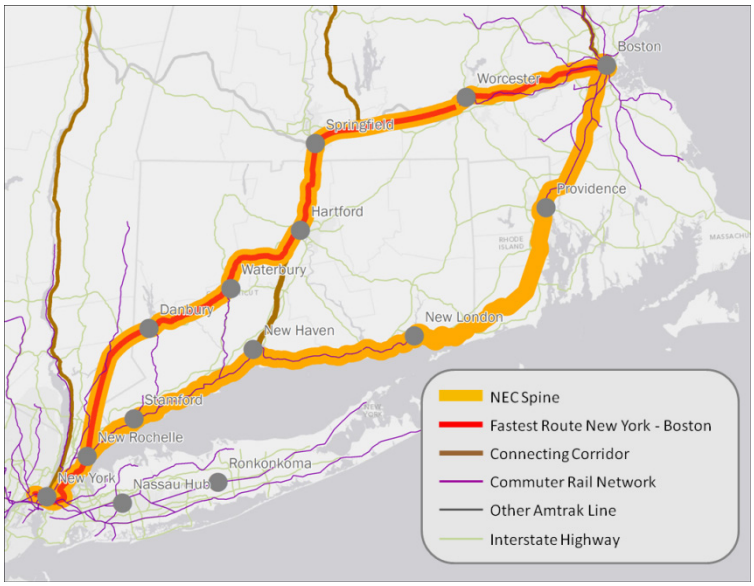
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: North42

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North43

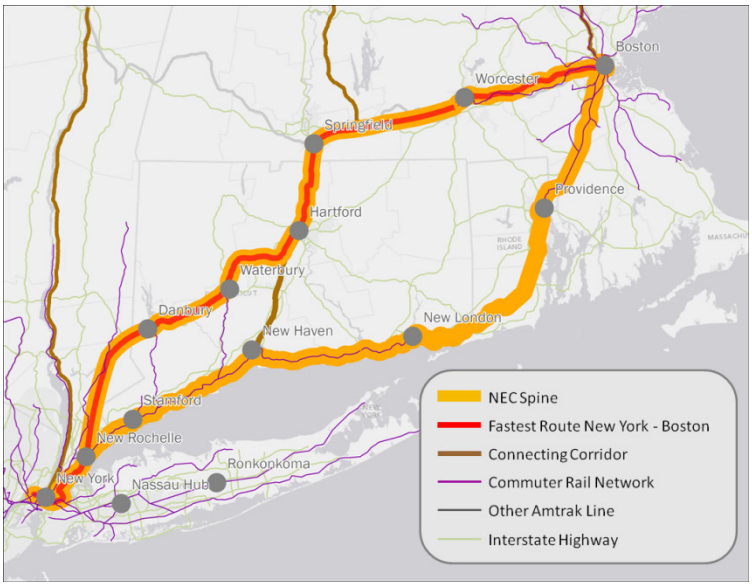
Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, New Rochelle, Danbury, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, New Rochelle, Danbury, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North44

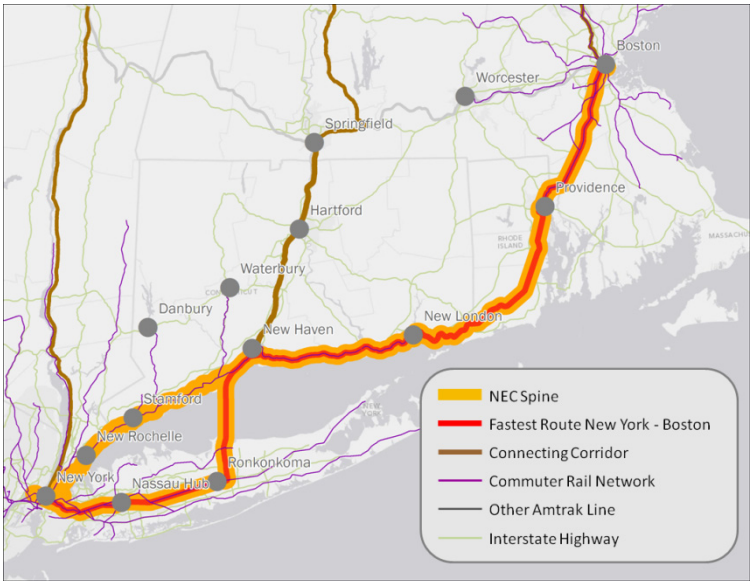
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Long Island, New Haven, New London, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, New London, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

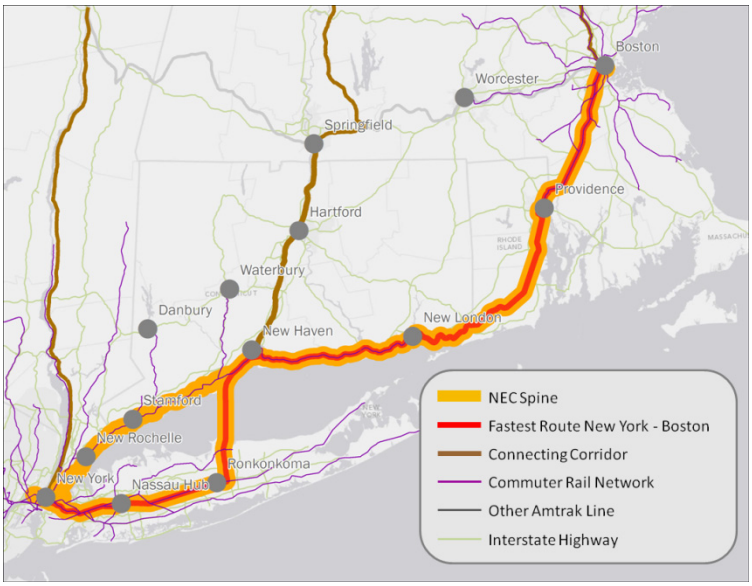


Initial Alternative: North45

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, New London, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

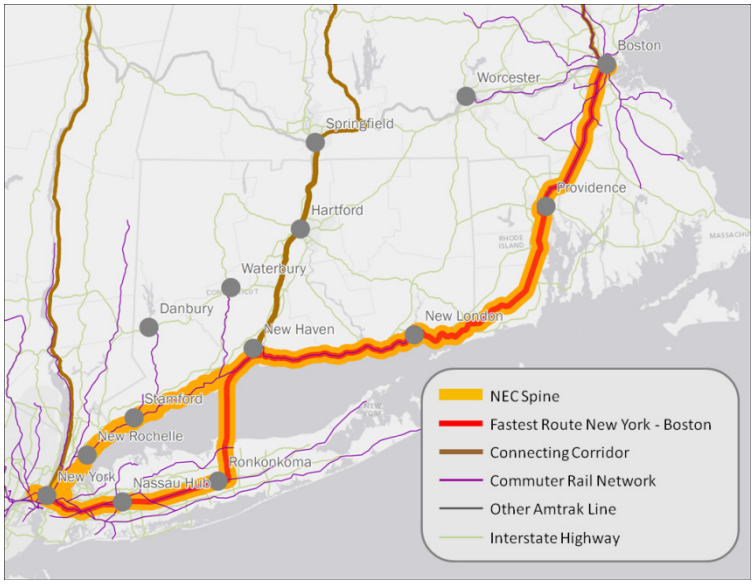
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, New London, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North46

Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, New London, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, New London, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North47

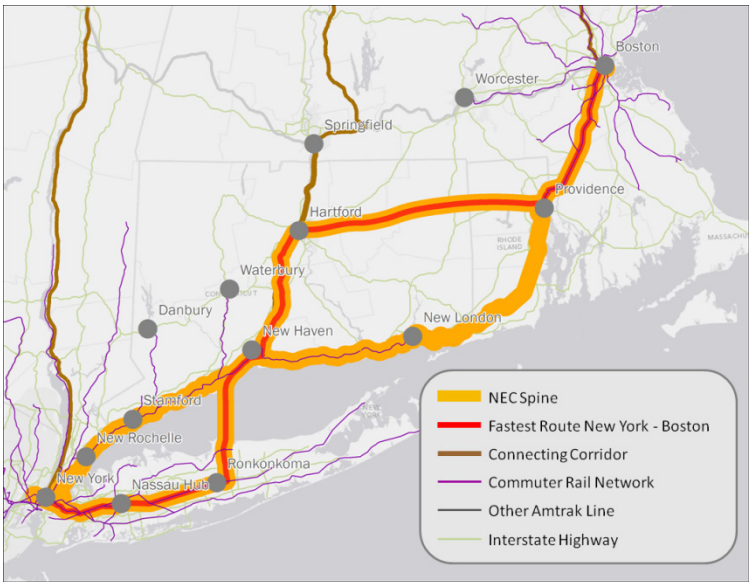
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.



Initial Alternative: North48

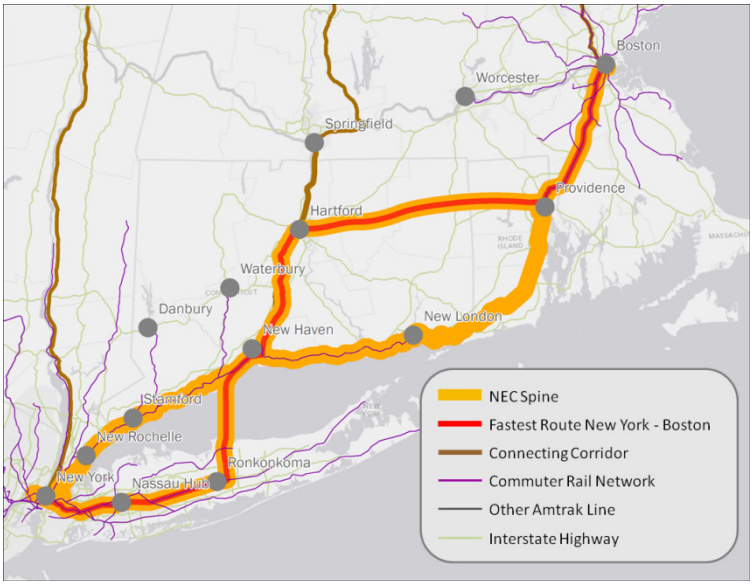
Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: North49

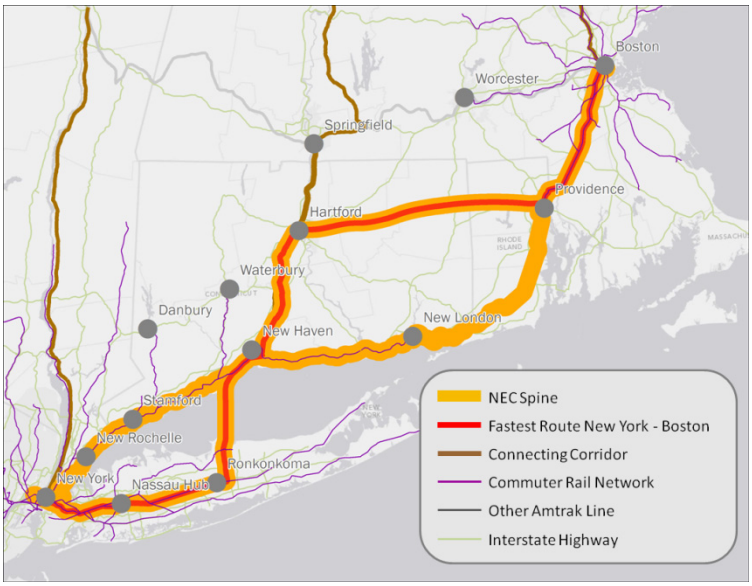
Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North50

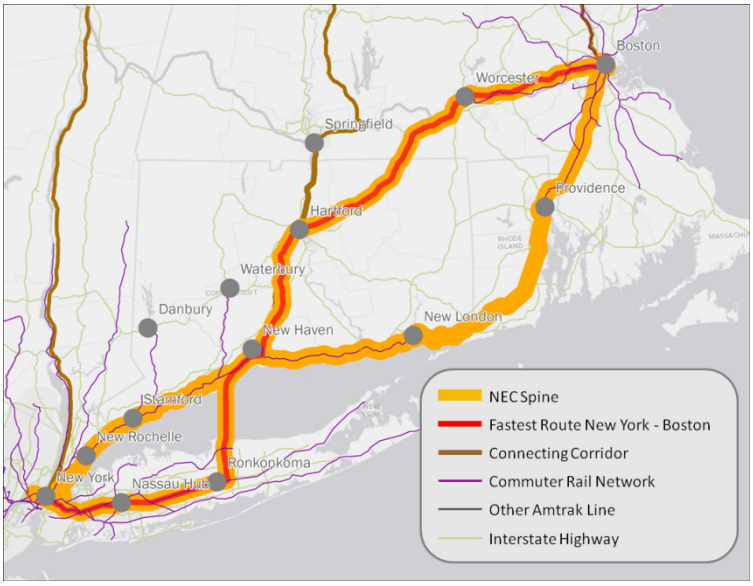
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

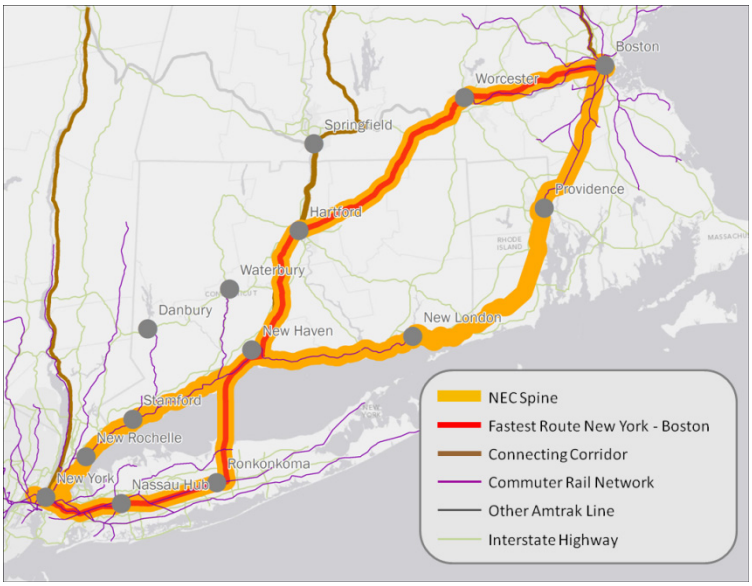


Initial Alternative: North51

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

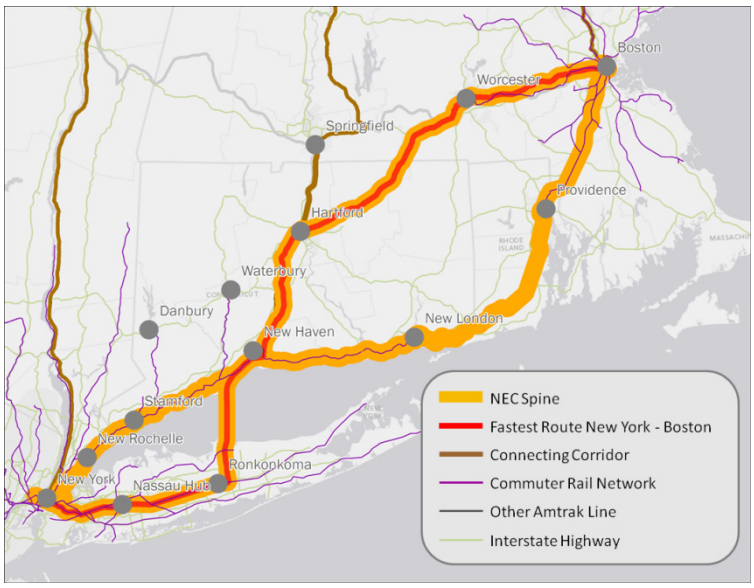
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North52

Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

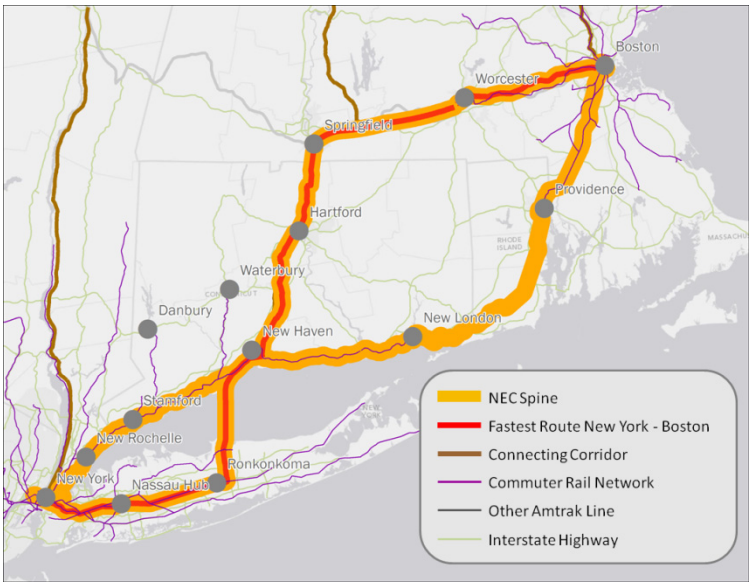
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North53

Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

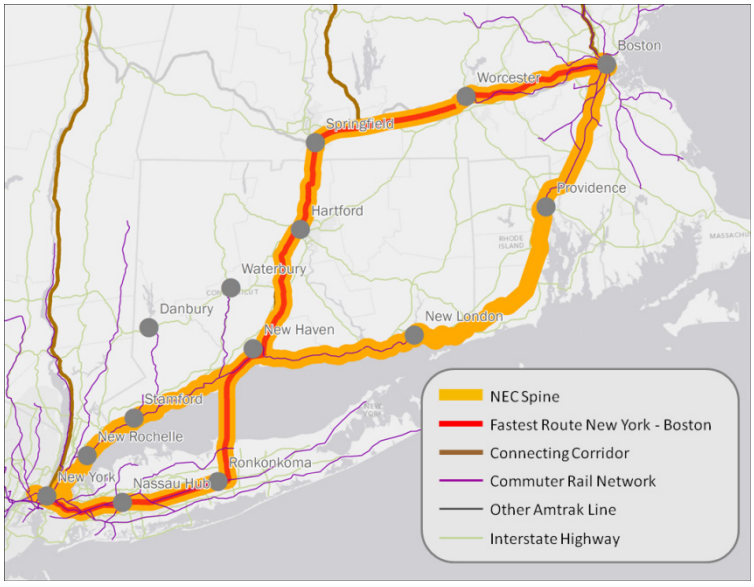
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: North54

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North55

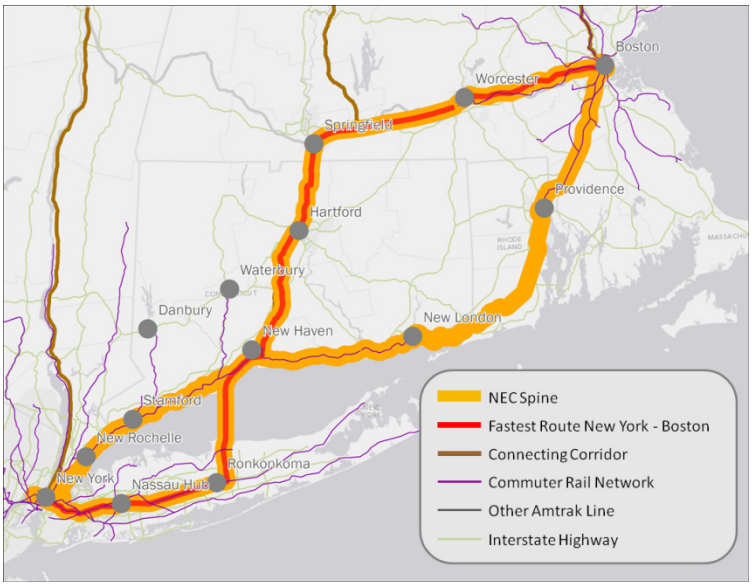
Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Long Island, New Haven, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Long Island, New Haven, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North56

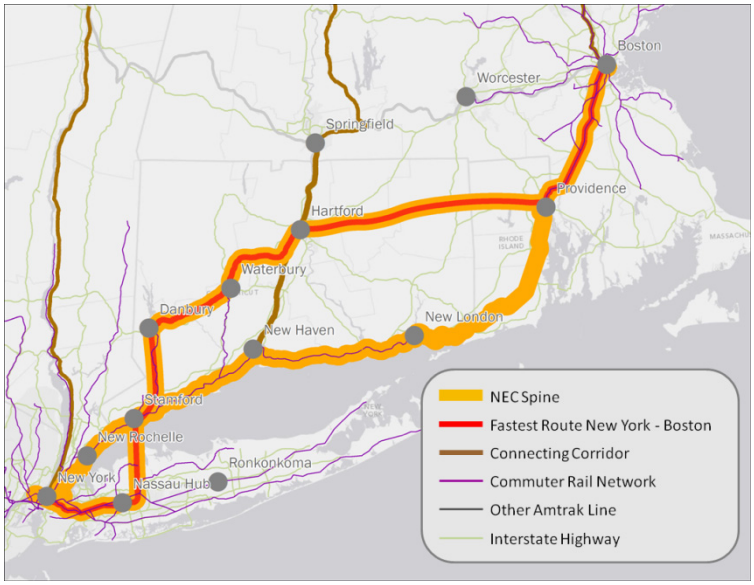
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

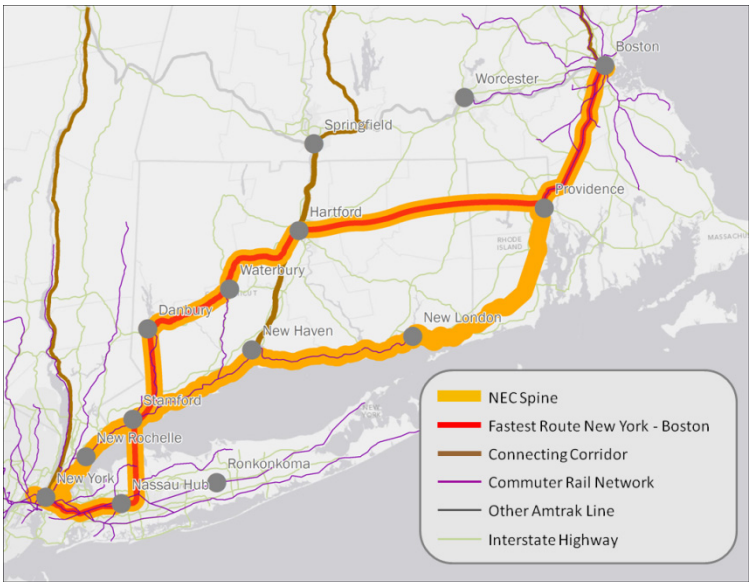


Initial Alternative: North57

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

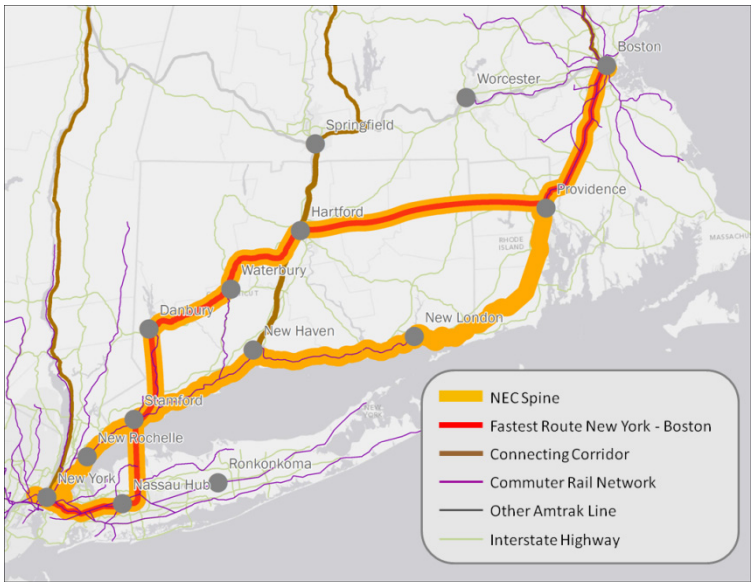
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North58

Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Providence, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

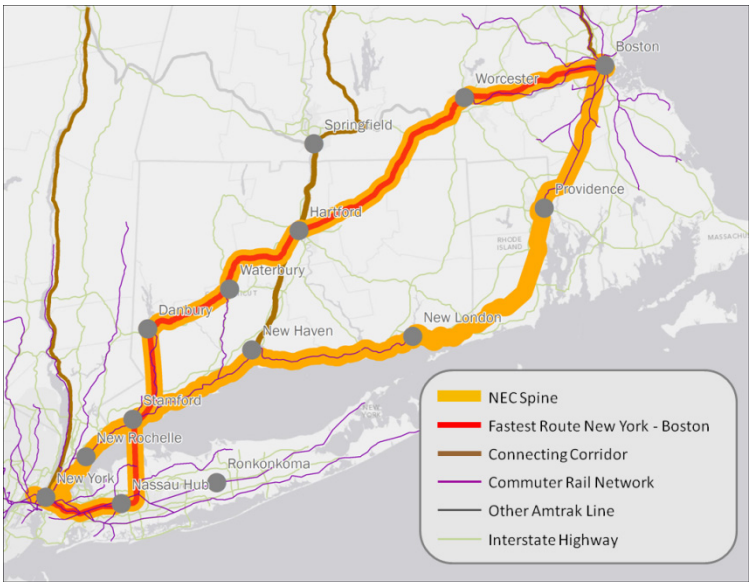
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Providence, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: North59

Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

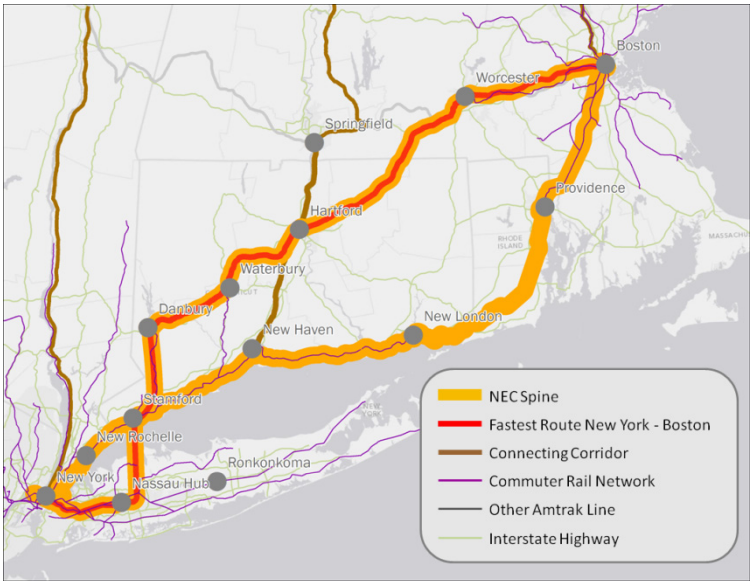
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: North60

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North61

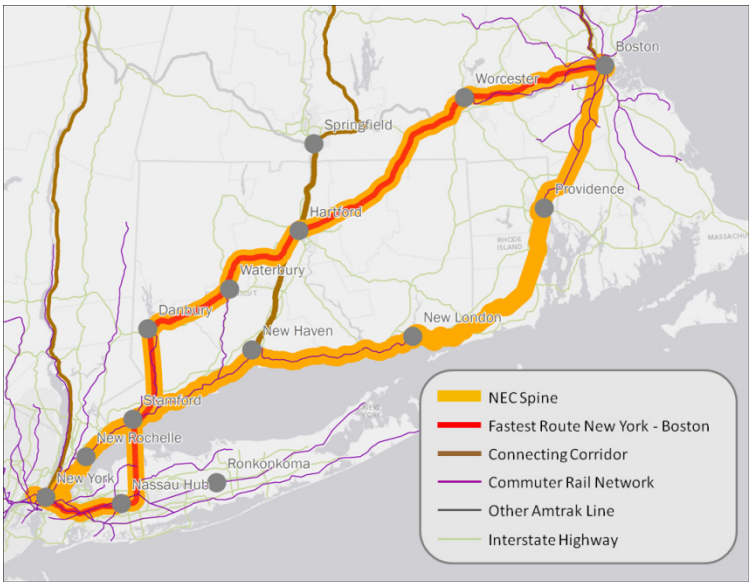
Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Worcester, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Worcester, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.



Initial Alternative: North62

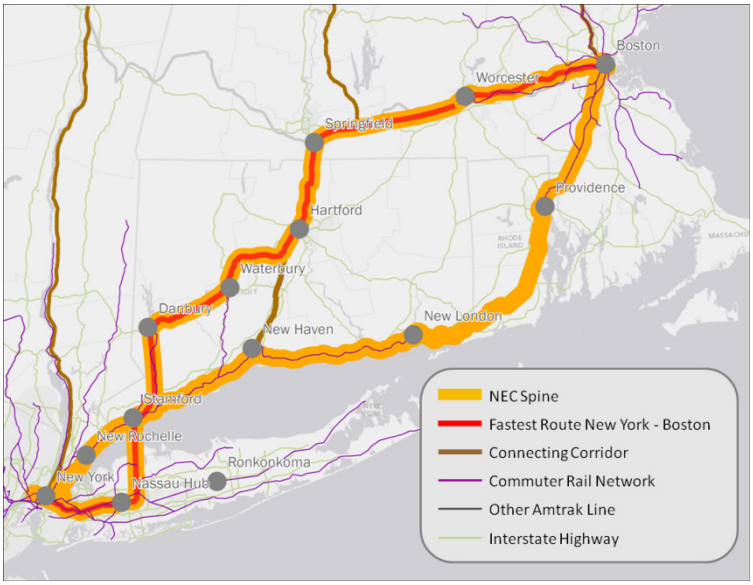
Current Mix of Services with Focus on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

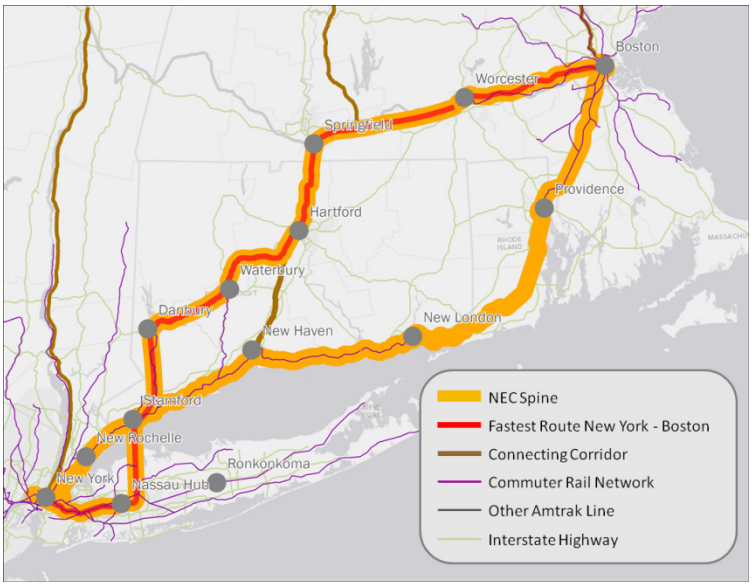


Initial Alternative: North63

Coordinated, Frequent Service Focused on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

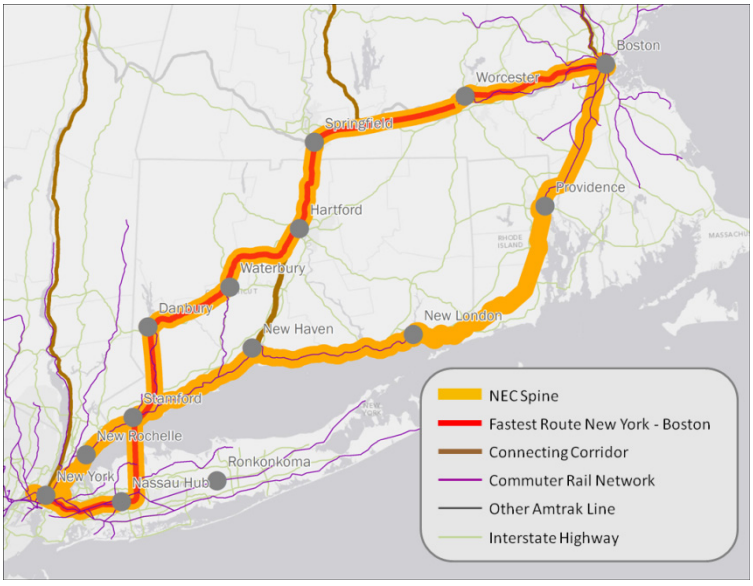
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Springfield, and Boston. Provides enough capacity that all inter-city and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: North64

Expanded Mix of Services Focused on All Markets with New Route Connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Springfield, and Boston

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new route connecting NYC, Nassau, Stamford, Danbury, Waterbury, Hartford, Springfield, and Boston. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: South1

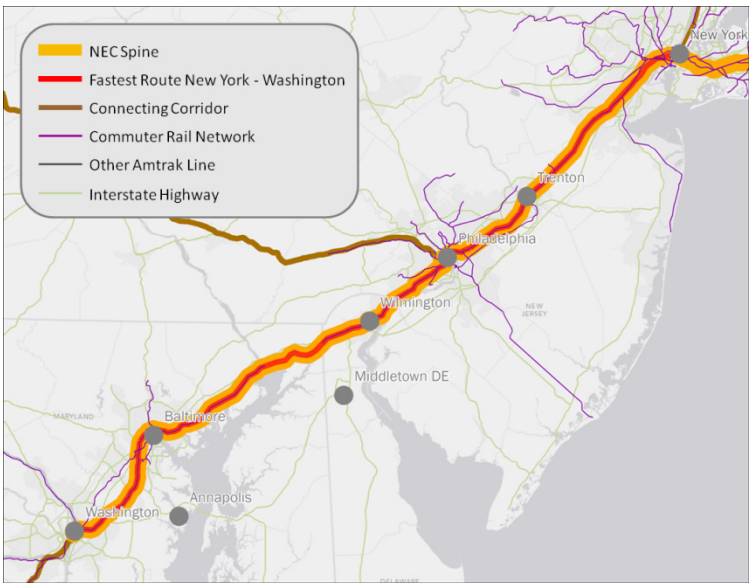
Current Mix of Services with Focus on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline
Service Definition	Current Mix
Service Focus	Regional

Description

Responds to growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South2

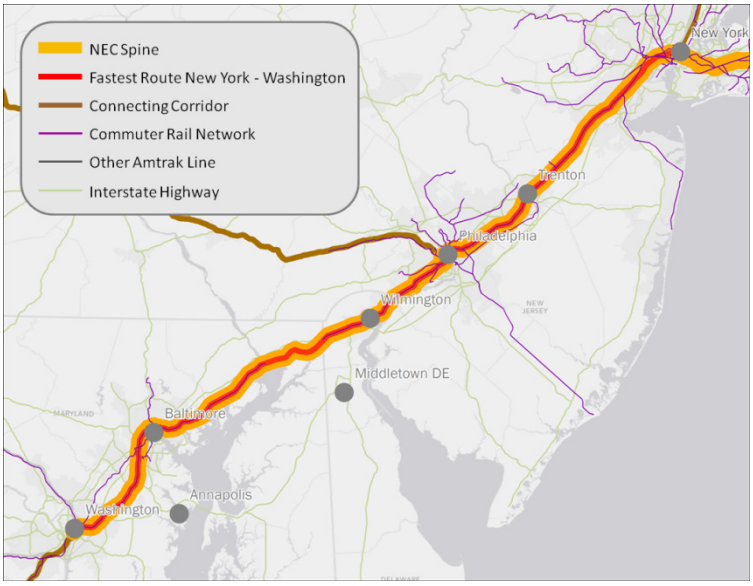
Current Mix of Services with Focus on Primary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Intercity Primary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South3

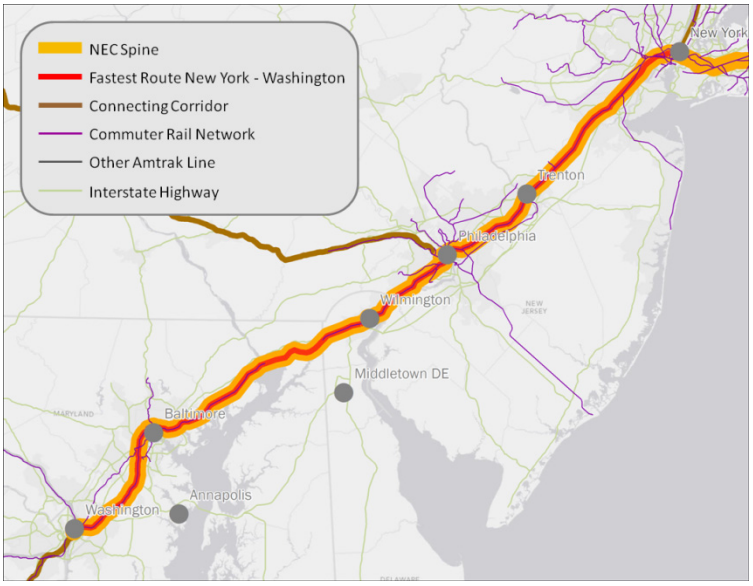
Current Mix of Services with Focus on Secondary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Intercity Secondary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South4

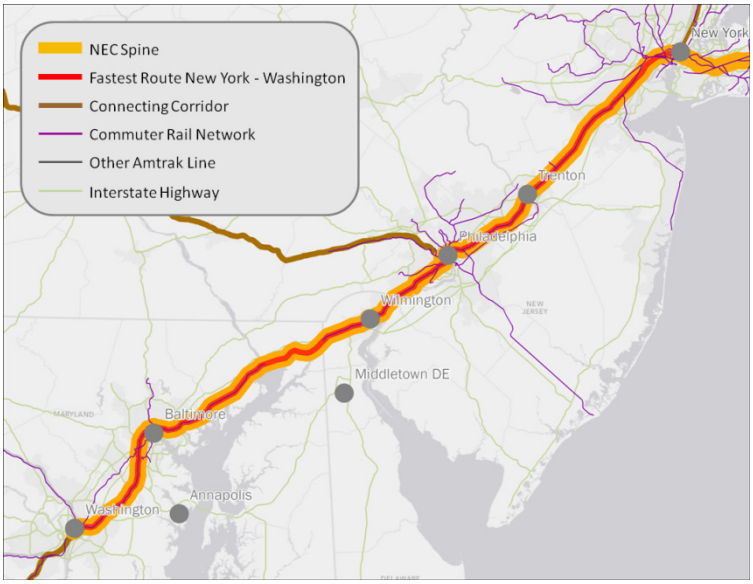
Current Mix of Services with Focus on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Regional

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South5

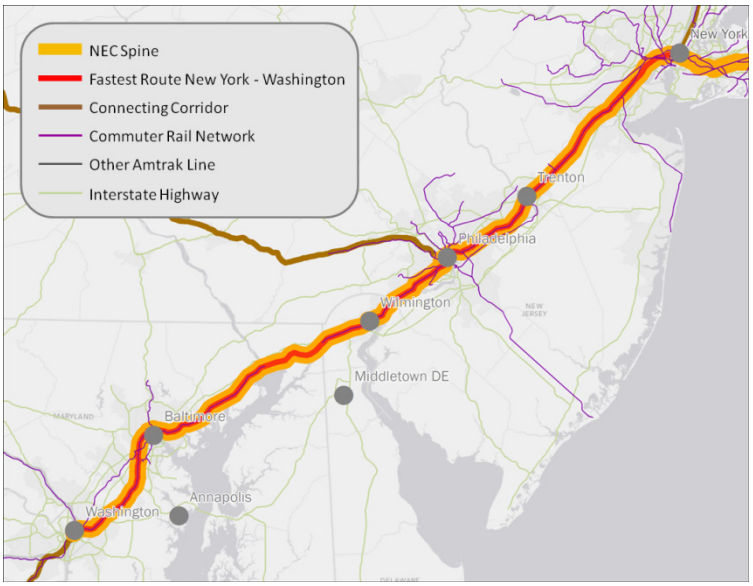
Current Mix of Services with Focus on Connecting Corridors via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Current Mix
Service Focus	Connecting

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South6

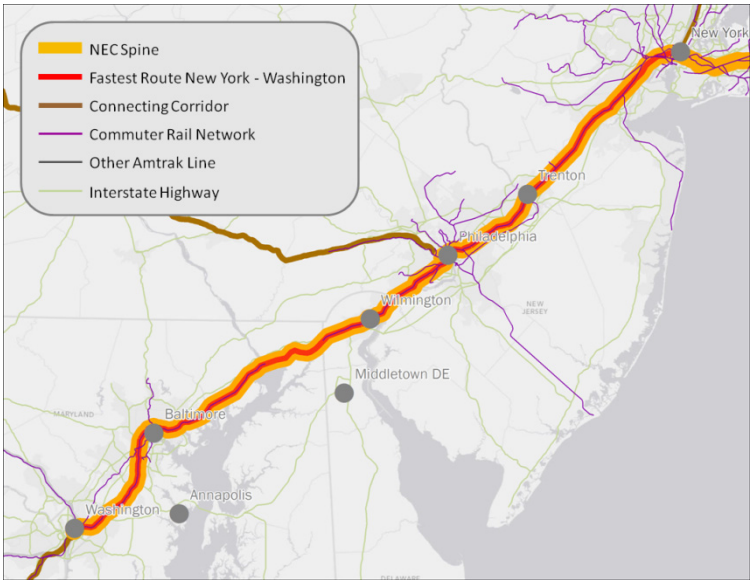
Coordinated, Frequent Service Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Intercity Primary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

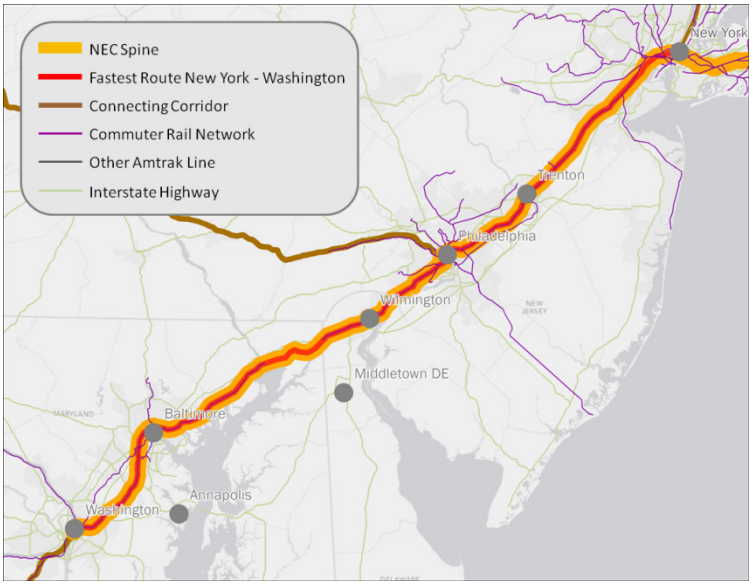


Initial Alternative: South7

Coordinated, Frequent Service Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Intercity Secondary



Description

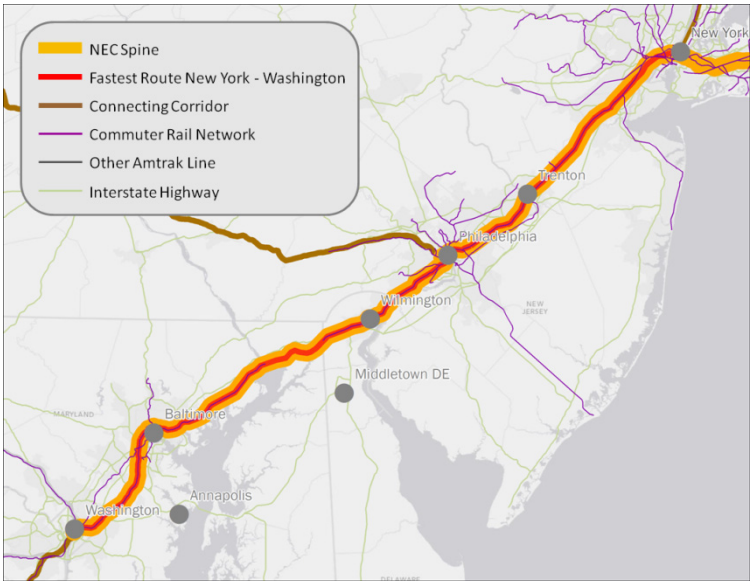
Meets growth in existing markets via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South8

Coordinated, Frequent Service Focused on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Regional



Description

Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South9

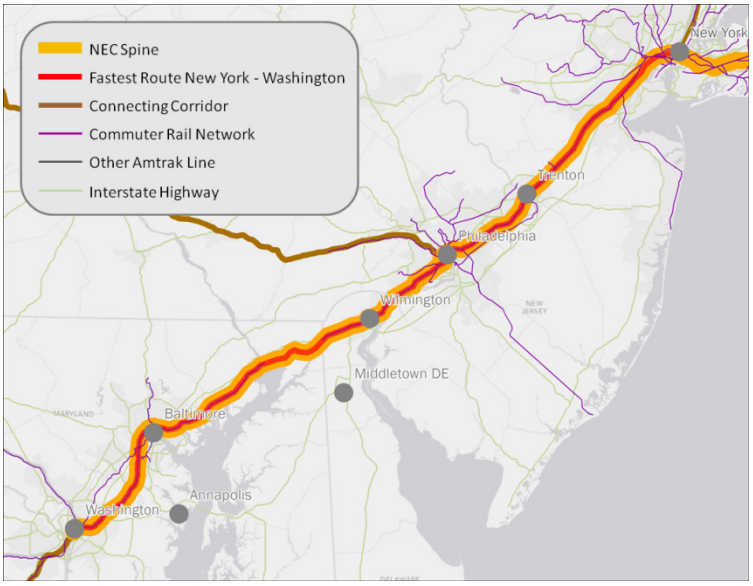
Coordinated, Frequent Service Focused on Connecting Corridors via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Simplified Service
Service Focus	Connecting

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: South10

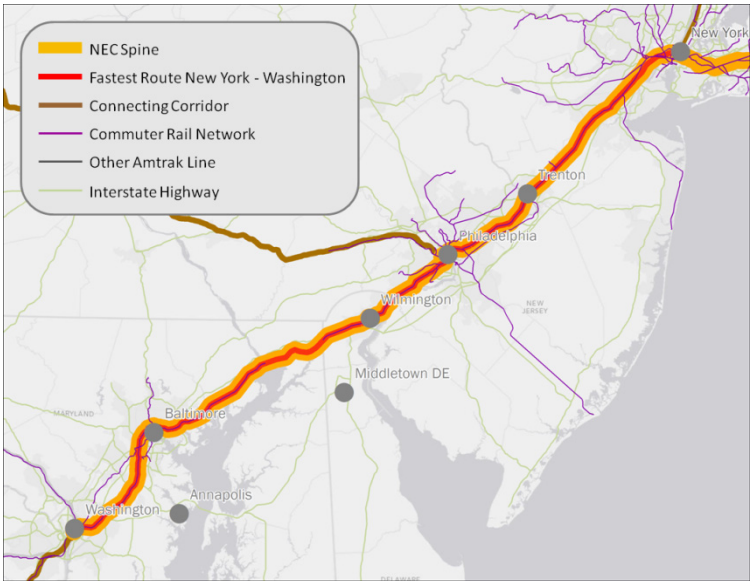
Expanded Mix of Services Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Primary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: South11

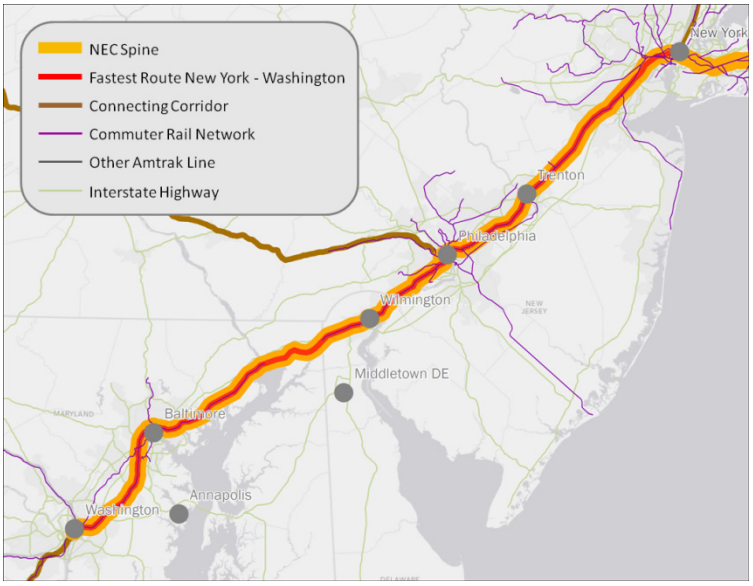
Expanded Mix of Services Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Secondary

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: South12

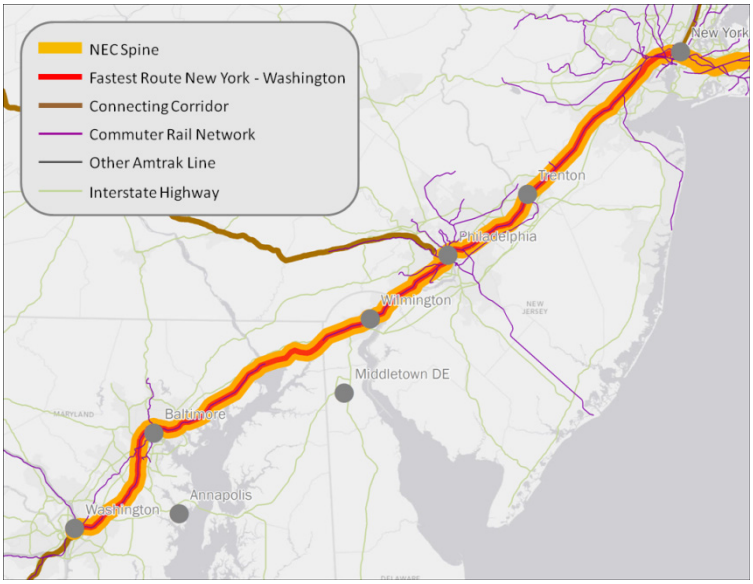
Expanded Mix of Services Focused on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Regional

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: South13

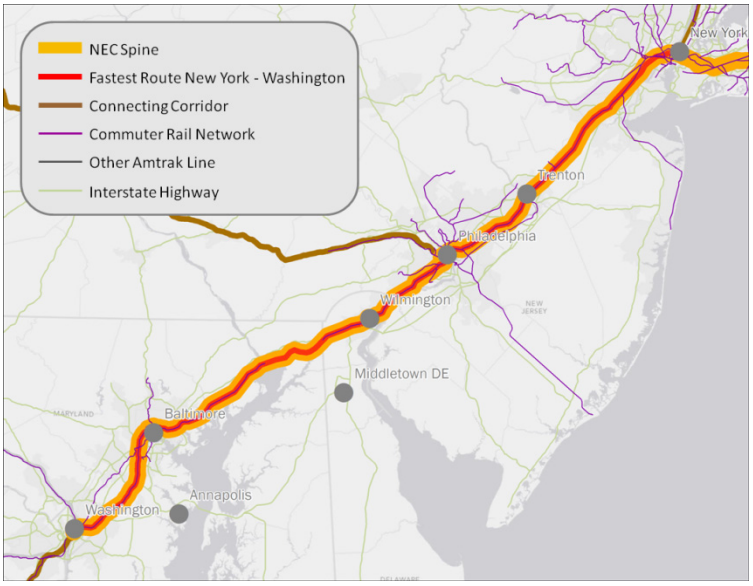
Expanded Mix of Services Focused on Connecting Corridors via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Baseline Plus
Service Definition	Expanded One-Seat Ride
Service Focus	Regional

Description

Meets growth in existing markets via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: South14

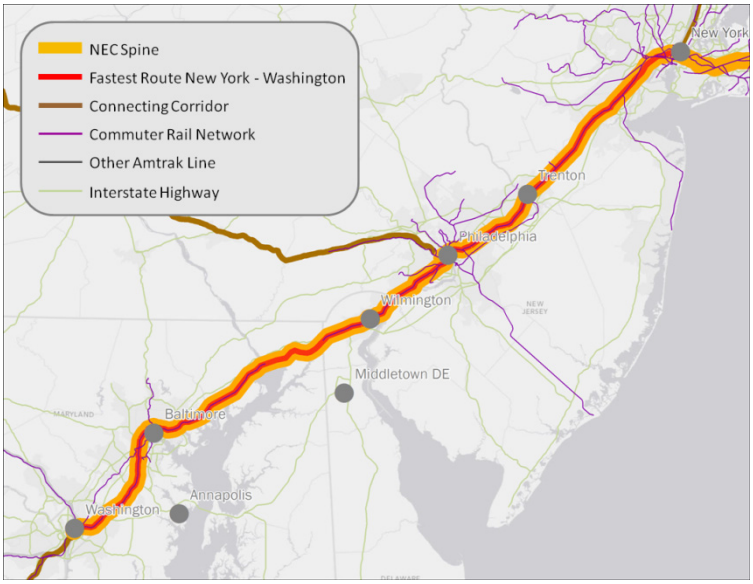
Current Mix of Services with Focus on Primary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Intercity Primary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South15

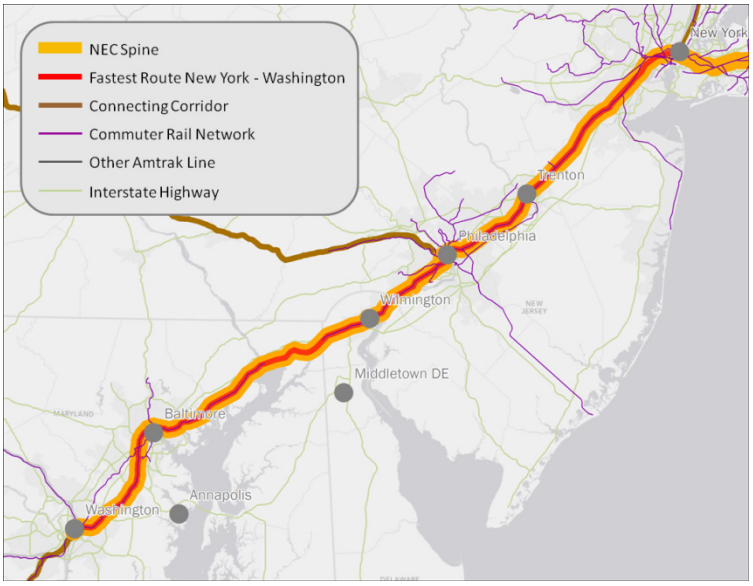
Current Mix of Services with Focus on Secondary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Intercity Secondary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South16

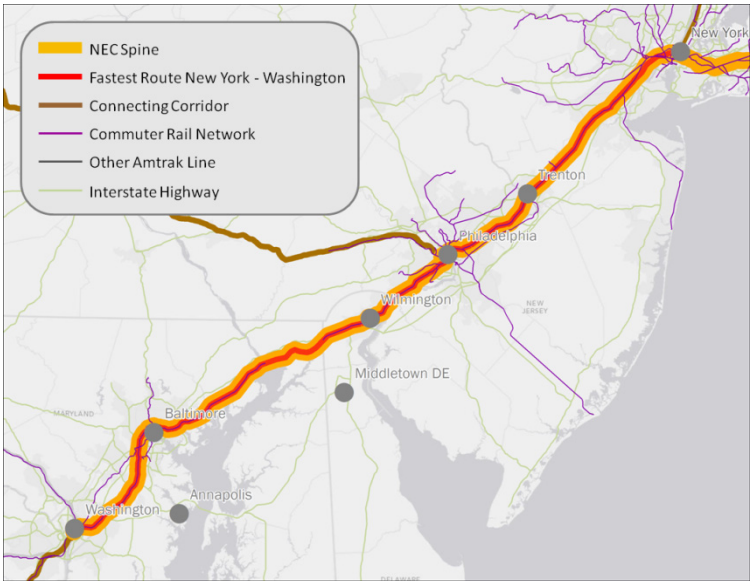
Current Mix of Services with Focus on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Regional

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South17

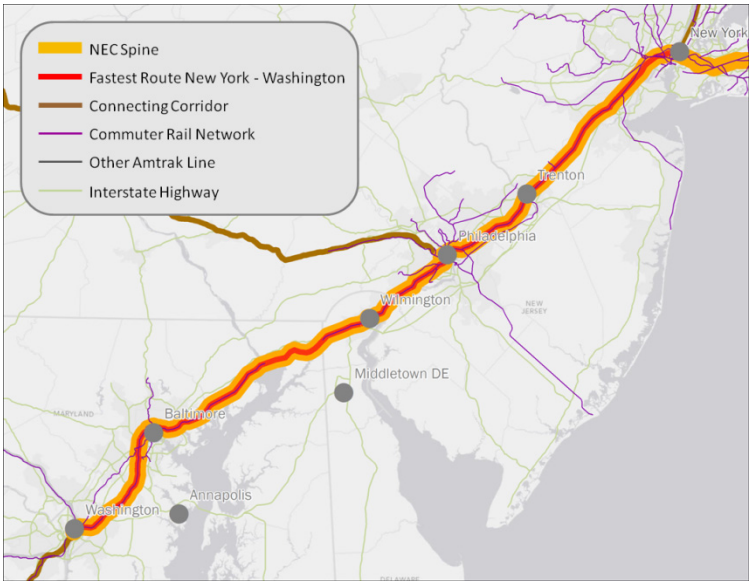
Current Mix of Services with Focus on Connecting Corridors via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Current Mix
Service Focus	Connecting

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides current mix of express, regional, and commuter services.



Initial Alternative: South18

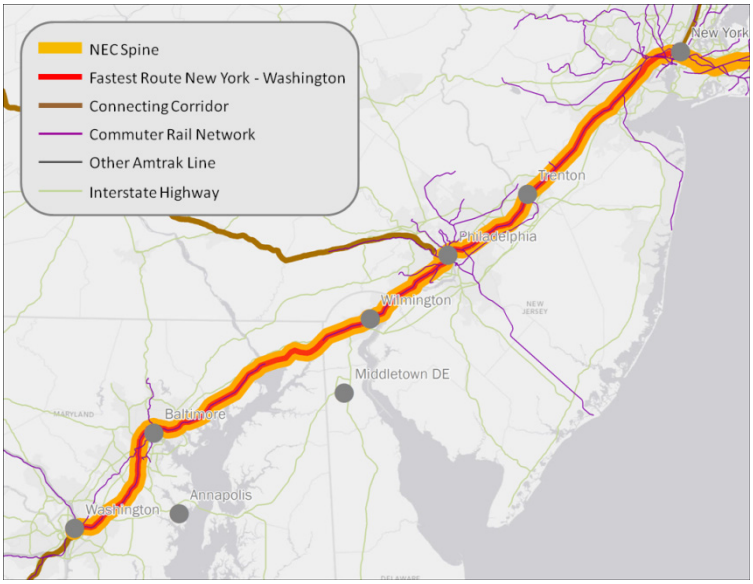
Coordinated, Frequent Service Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Intercity Primary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

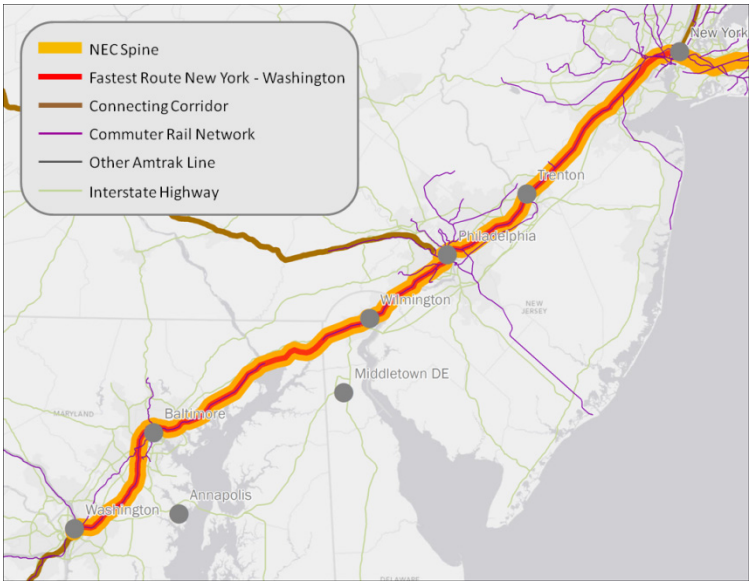


Initial Alternative: South19

Coordinated, Frequent Service Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Intercity Secondary



Description

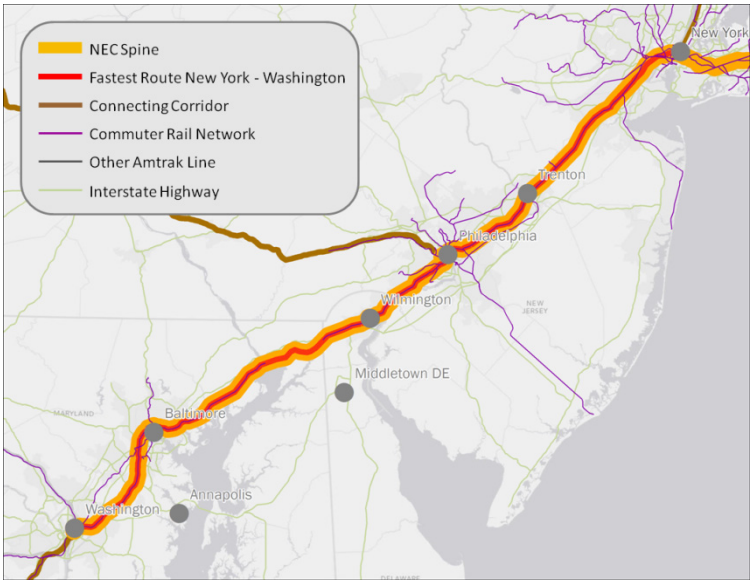
Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South20

Coordinated, Frequent Service Focused on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Regional



Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South21

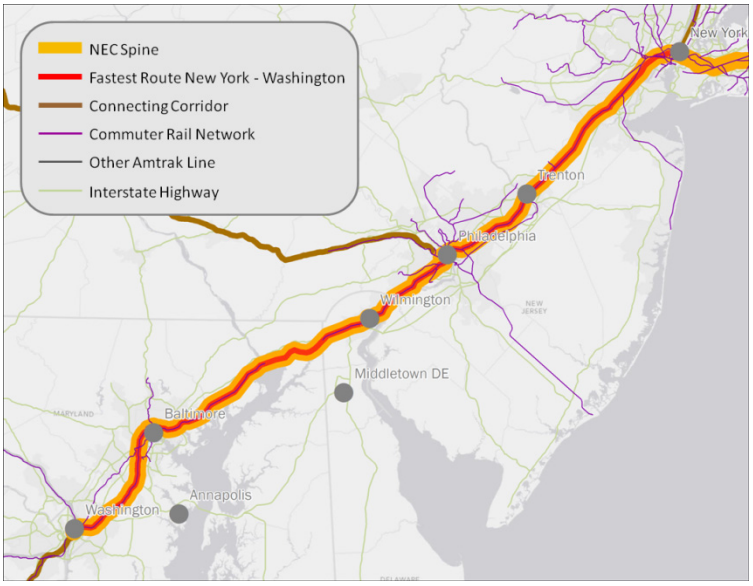
Coordinated, Frequent Service Focused on Connecting Corridors via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Simplified Service
Service Focus	Connecting

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service to connecting corridors with remaining capacity allocated to intercity and regional markets. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.



Initial Alternative: South22

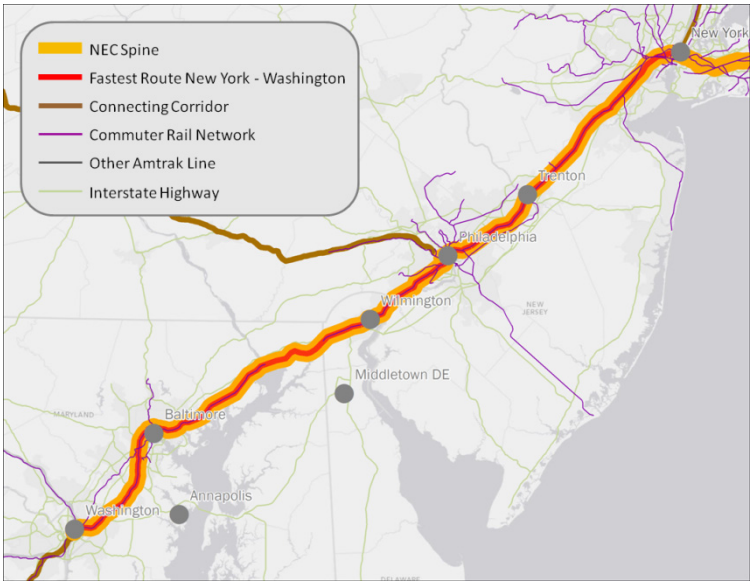
Expanded Mix of Services Focused on Primary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Primary

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes intercity travel between primary markets, with remaining capacity allocated to secondary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.

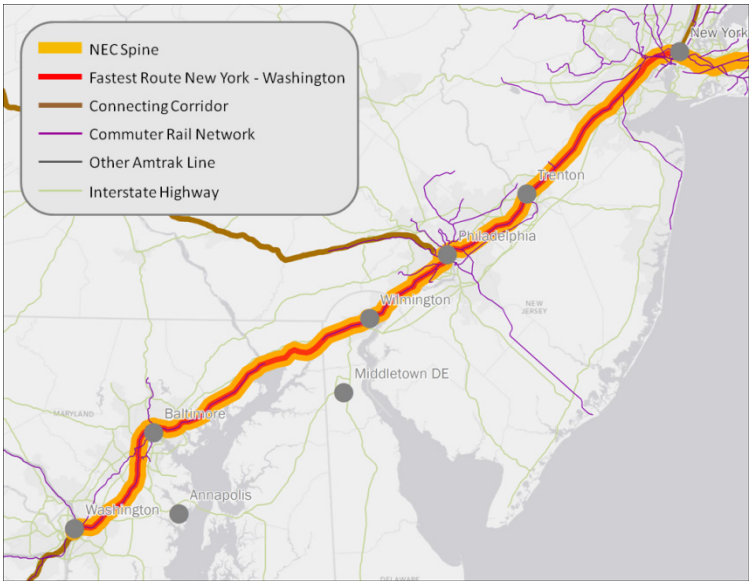


Initial Alternative: South23

Expanded Mix of Services Focused on Secondary Intercity Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Intercity Secondary



Description

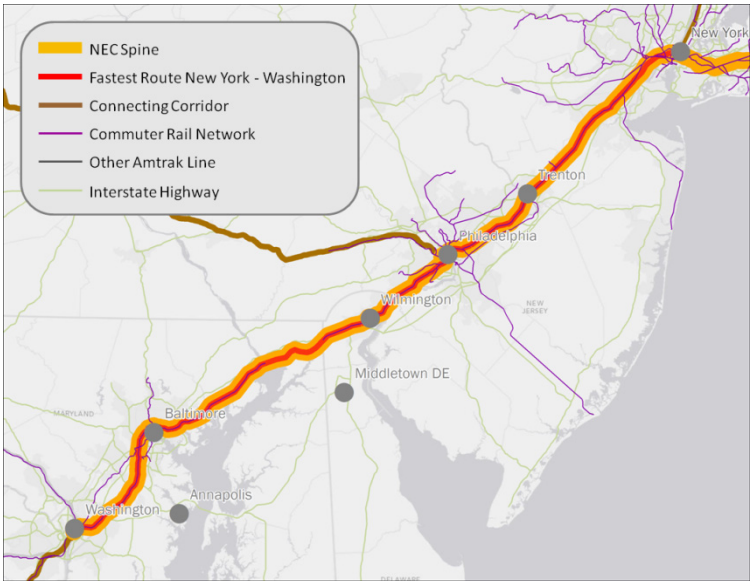
Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service that connects secondary markets with primary markets, with remaining capacity allocated to primary intercity markets and regional markets. Provides a broad range of service types tailored to individual markets.

Initial Alternative: South24

Expanded Mix of Services Focused on Regional Service via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Regional



Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes regional markets with remaining capacity allocated to intercity travel between primary and secondary markets. Provides a broad range of service types tailored to individual markets.

Initial Alternative: South25

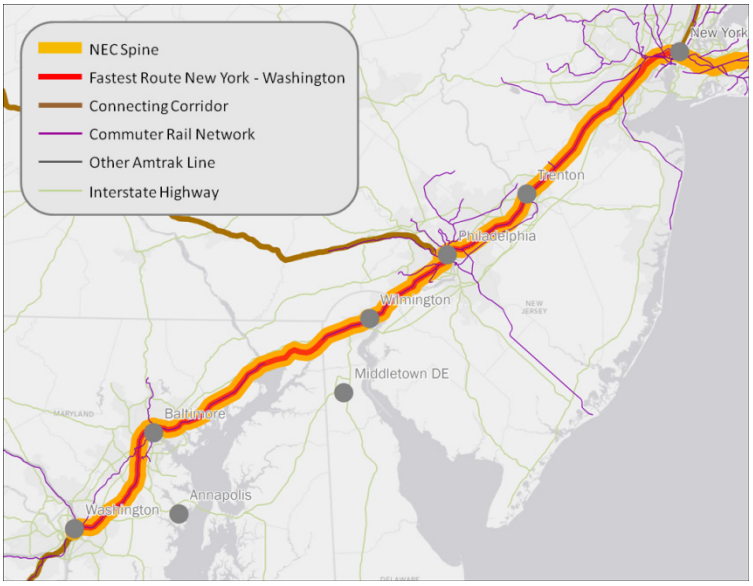
Expanded Mix of Services Focused on Connecting Corridors via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	Medium
Service Definition	Expanded One-Seat Ride
Service Focus	Connecting

Description

Meets growth in existing markets and provides capacity for additional growth via existing NEC alignment. Prioritizes service to connecting corridors, with remaining capacity allocated to intercity and regional markets. Provides a broad range of service types tailored to individual markets.



Initial Alternative: South26

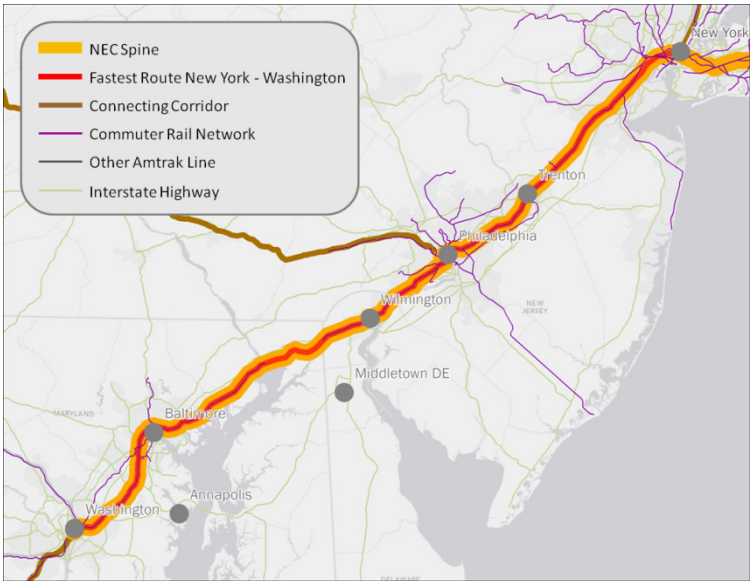
Current Mix of Services with Focus on All Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets

Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

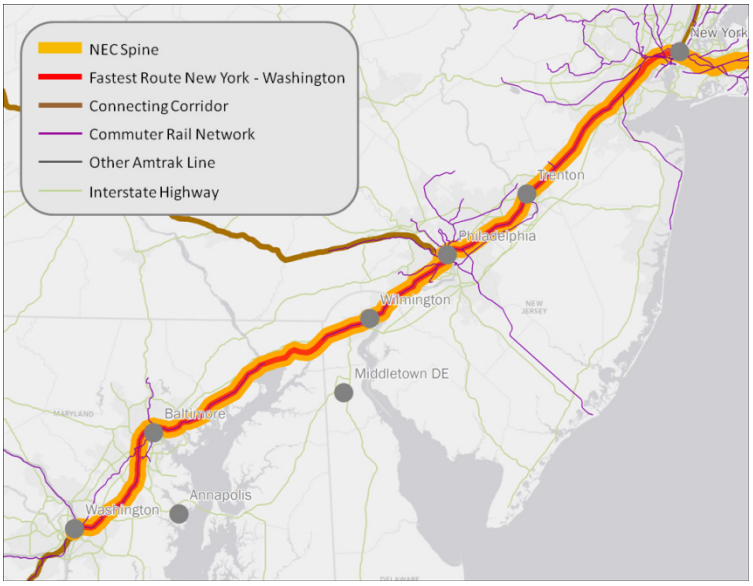


Initial Alternative: South27

Coordinated, Frequent Service Focused on All Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

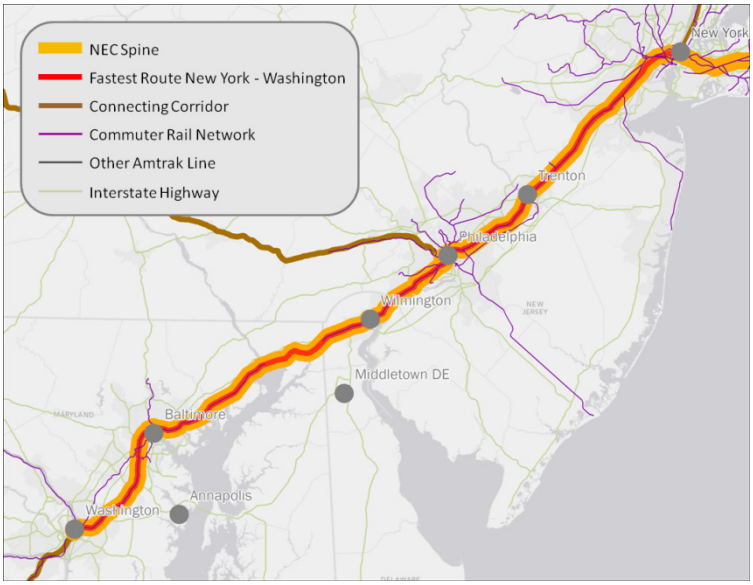
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South28

Expanded Mix of Services Focused on All Markets via Existing NEC Alignment between NYC and Washington

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

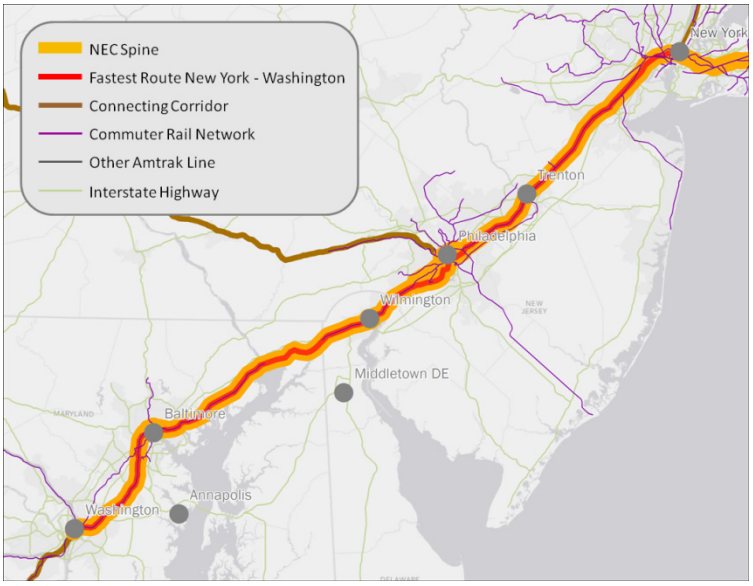
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: South29

Current Mix of Services with Focus on All Markets with New Route Sections Through Philadelphia, Wilmington, and Baltimore

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

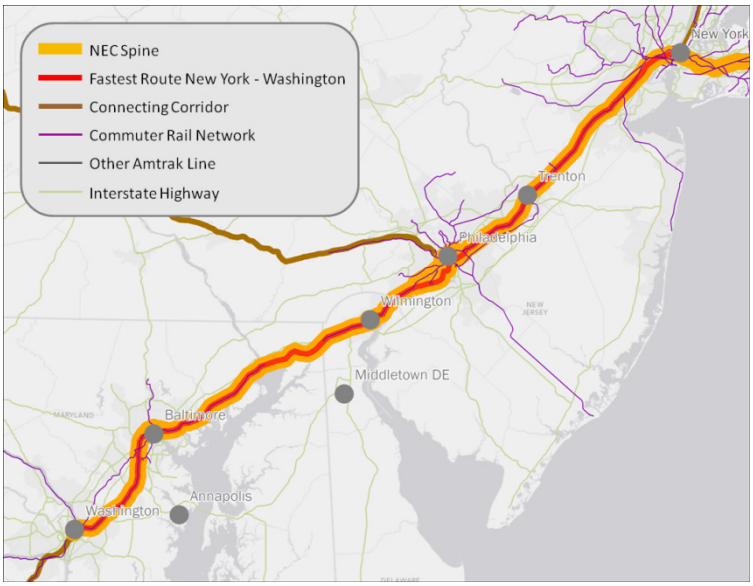
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new sections through Philadelphia, Wilmington, and Baltimore. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: South30

Coordinated, Frequent Service Focused on All Markets with New Route Sections Through Philadelphia, Wilmington, and Baltimore

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

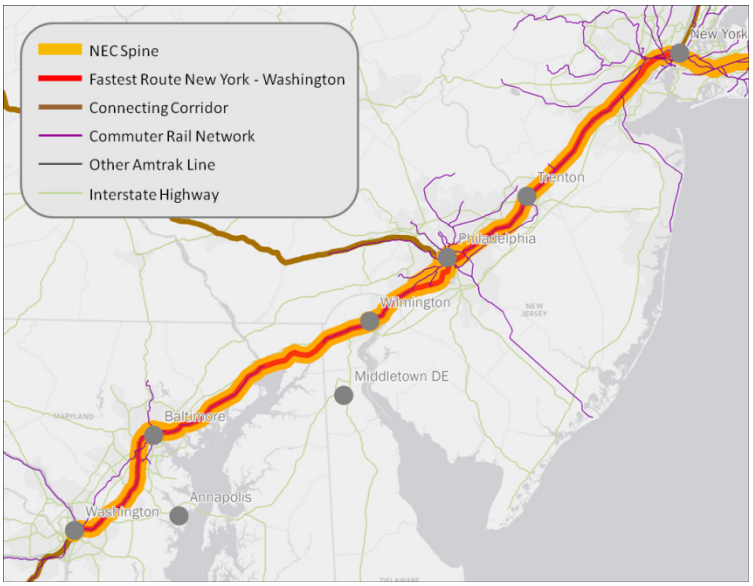
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new sections through Philadelphia, Wilmington, and Baltimore. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South31

Expanded Mix of Services Focused on All Markets with New Route Sections Through Philadelphia, Wilmington, and Baltimore

Quick Facts

Program Investment Level	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

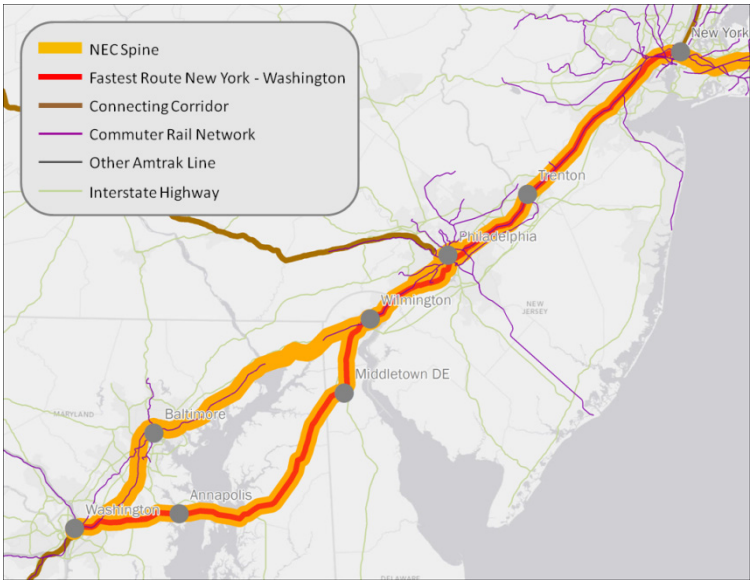
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with new sections through Philadelphia, Wilmington, and Baltimore. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.

Initial Alternative: South32

Current Mix of Services with Focus on All Markets with New Route Sections Through Philadelphia and Wilmington, and New Route from Wilmington to Washington via Delmarva Peninsula and Annapolis

Quick Facts

Program Investment Level	High
Service Definition	Current Mix
Service Focus	All Markets



Description

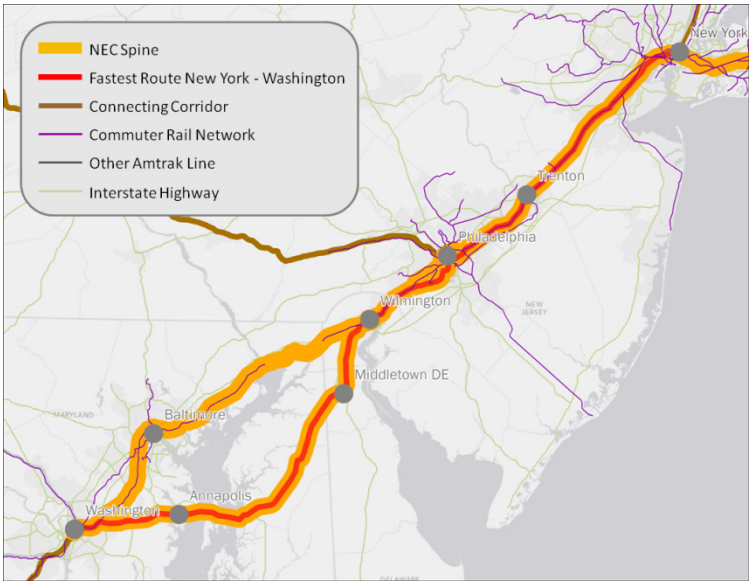
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with sections through Philadelphia and Wilmington, and new route from Wilmington to Washington via Delmarva Peninsula and Annapolis. Provides enough capacity that all intercity and regional markets can be served. Provides current mix of express, regional, and commuter services.

Initial Alternative: South33

Coordinated, Frequent Service Focused on All Markets with New Route Sections Through Philadelphia and Wilmington, and New Route from Wilmington to Washington via Delmarva Peninsula and Annapolis

Quick Facts

Program Investment Level	High
Service Definition	Simplified Service
Service Focus	All Markets



Description

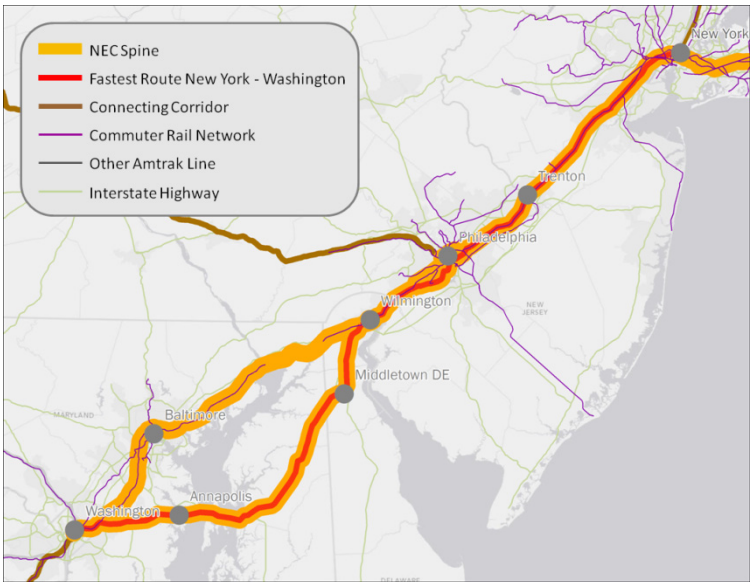
Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with sections through Philadelphia and Wilmington, and new route from Wilmington to Washington via Delmarva Peninsula and Annapolis. Provides enough capacity that all intercity and regional markets can be served. Provides express service between primary markets and coordinates timing of regional and express services to provide frequent service between secondary and primary markets.

Initial Alternative: South34

Expanded Mix of Services Focused on All Markets with New Route Sections Through Philadelphia and Wilmington, and New Route from Wilmington to Washington via Delmarva Peninsula and Annapolis

Quick Facts

High	High
Service Definition	Expanded One-Seat Ride
Service Focus	All Markets



Description

Meets growth in existing markets and provides capacity to meet growth in all markets by improving existing NEC alignment and with sections through Philadelphia and Wilmington, and new route from Wilmington to Washington via Delmarva Peninsula and Annapolis. Provides enough capacity that all intercity and regional markets can be served. Provides a broad range of service types tailored to individual markets.